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FLIGHT

The AIRCRAFT ENGINEER AND AIRSHIPS

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XXIX

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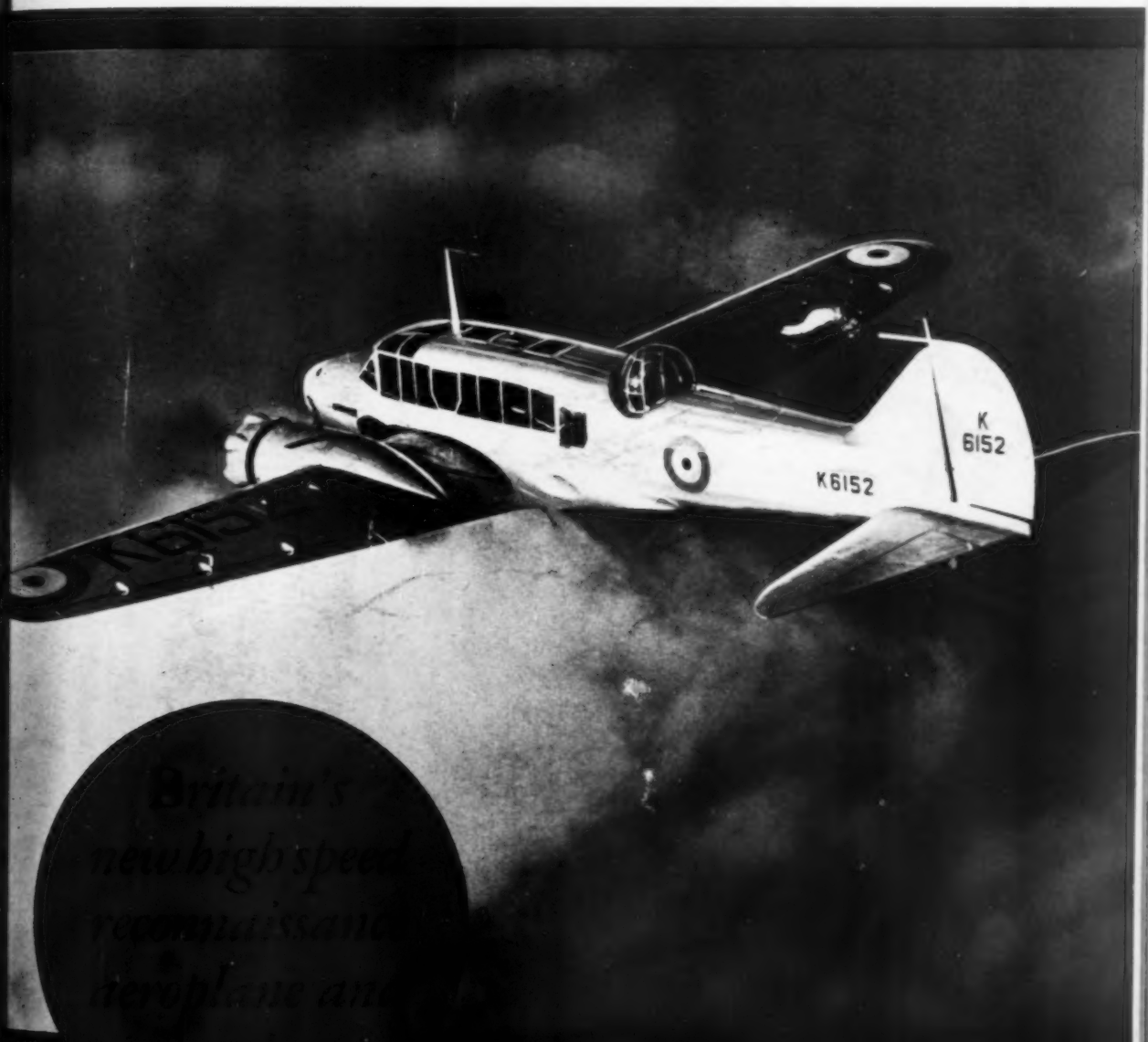

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FLIGHT

The AIRCRAFT ENGINEER AND AIRSHIPS

FIRST AERONAUTICAL WEEKLY IN THE WORLD : FOUNDED 1909

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The Supreme Consideration

A MINISTRY of Defence is the ideal method of safeguarding a nation, but an ideal is not always practicable. Every Government which has examined the question has come to the conclusion that such a plan could not be made to work, chiefly because the Minister would have to be a superman such as is not often born in these degenerate days. Sir Murray Sueter probably had no hopes that his Bill for the creation of such a Ministry would ever become an Act, but he did excellent service by providing the occasion for a debate of unusual importance on the subject which more than any other is now causing anxiety in the public mind. Everybody wants to feel safe; everybody knows that a huge sum will have to be found for defence, and that for that reason, if no other, there is no chance of another sixpence coming off the income tax; and everybody wants some assurance that, not only will this expenditure give us security, but that it will give us the greatest possible value for money.

While the Government made it clear that a Ministry of Defence is not practical politics, it is quite certain that they cannot disregard the anxieties of the House of Commons about efficiency in defence matters. The solution which seemed to find most favour was that the Committee of Imperial Defence should be strengthened, should have a whole-time chairman who would be a member of the Cabinet, should have a whole-time secretary, and that the chairman should be assisted by a staff of officers who had graduated at the Imperial Defence College, and had there been trained to think in terms of all three fighting Services together.

There is much which is attractive in that idea. When combined operations are necessary there is an obvious weakness in having the fighters of the three elements in watertight compartments. It is the same when the three wrangle to get the greatest share of defence money out of the Treasury. A score made by one may mean a national danger through the weakness of another. It is worse when the three compartments are not even properly watertight. There is a very old discussion as to whether the defence of the coast line is properly the function of the Navy or of the Army. There is still a dispute raging as to whether the Fleet Air Arm ought to belong to the Air Ministry or to the Admiralty. Army spokesmen have expressed indignation that the Air Force should maintain armoured cars in Iraq and the Middle East There is a question, and it may be the most vital of all, whether the War Office ought not to make over to the Air Ministry the anti-aircraft guns and searchlights.

There is at least a chance that with a really efficient Committee of Imperial Defence actively supervising the whole question these disputes might become less important. Logical principles might then be subordinated, without peril to the country, to efficient working compromises. Under the watchful eye of an active and influential C.I.D., it should never again be possible, for example, for the War Office to deprive the air defence of Great Britain of essential practice by economising on allowances for Territorial camps and on the equipment of anti-aircraft batteries and battalions. Inter-Service disputes must be stopped, and this plan may perhaps produce harmonious co-operation.

Bombs and Birds

THE Air Ministry has scored a point in popular favour by the readiness which it has shown to meet all those interests which object to the establishment of an air armament camp on the coast of Northumberland near Holy Island, and to discuss the matter with them. A meeting and a discussion are very good things, for they allow the objectors to state their case, which in itself is a safety valve, and it also enables the objectors to appreciate the case of the Air Ministry. After talking things over, the objectors are not likely to go away grumbling about bureaucratic methods and militarism.

The case of the objectors to the establishment of a bombing and firing range almost always commands a

certain amount of sympathy. No one likes to think of bird sanctuaries being disturbed, though experience has shown that birds are very adaptable creatures and soon get used to the noises on the range. The fear apparently is that the noise may frighten them away, not that some of them may fall victims to the firing of the machine guns or the explosion of the bombs. The chances of such casualties must be very small, and an occasional unfortunate accident would not make any material difference to the sanctuary. If it can be proved that the noise does not frighten the birds away, as some authorities hold that it can, the ornithological party would seem to have slight grounds for pressing their objections.

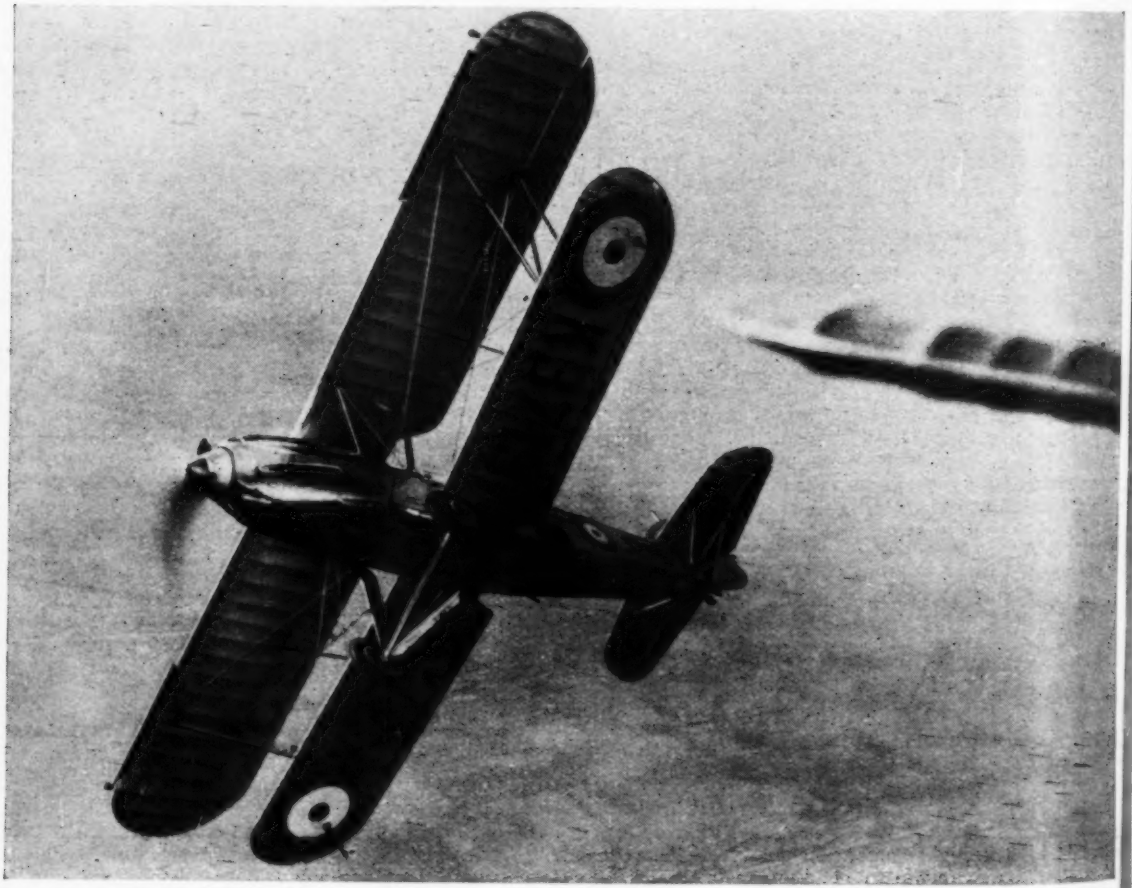
The historical and sacred associations of the neighbourhood of Lindisfarne form a different ground for objecting to the range. Those who press that point also command sympathy. The names of the Saints connected with Holy Island, St. Aidan and others, are not household words to every modern young person, but the ignorance of some people as regards English history is no reason for treating historical associations as a thing of nought.

Nevertheless, the present cannot be wholly sacrificed to the past. The twentieth century will in time become ancient history, and it must not be put on record that Britain failed in an air war because her airmen had not sufficiently practised with bomb and machine gun.

Restriction of Inhumanity

THE debate which followed the reading of Major Gen. Thuiller's paper on "Can Methods of Warfare be Restricted?" before the Royal United Service Institution recently suggested that the officers of the three fighting Services are united in the opinion that restriction is not possible or desirable.

The reader of the paper appealed for clear thinking on the subject, but he and his supporters did not always show that they were practising what the lecturer preached. It is, for instance, a fallacy to make a general statement such as "all war is inhumane," just as it is fallacious to say, as many have said in late years, "all war is wrong." That all war is inhumane is a very new doctrine, and may be said to date from April 22, 1915, when the Germans first made a gas attack on the Ypres salient. From very early times the nations of the more civilised parts of the world have held that war ought not to be inhumane, and have drawn up rules of war which were intended to restrict the suffering caused by war, and which have, in fact, very much restricted it. Such rules, if they are to be regarded, must not attempt to forbid too much. A prohibition of all air bombing would be futile. Rules of war there must be, and the only question is where to draw the restricting line.



GUARDIAN ANGEL TO THE INFANTRY : The newest Army Co-operation aeroplane to be adopted by the R.A.F. is the Hawker Hector with Napier-Halford Dagger III 24-cylinder air cooled engine. (*Flight* photograph.)

The Outlook

A Running Commentary on Air Topics

The Scandinavian Airway

A NEW and important, though hardly epoch-making, step has been taken by the Air Ministry in deciding to give a subsidy to British Airways, Ltd., for a service from Croydon to Sweden. At the same time, the Post Office has granted to the same company a contract to carry air mails on the north-bound journey.

In the last report of Imperial Airways it was noted that the Air Ministry had asked that firm to absolve the Ministry from its undertaking to give no subsidies for air services in Europe to any other firm but Imperial Airways, and that the proposition had been accepted. A new subsidised air service was then foreshadowed, and it has now come into being. Four foreign companies and another British concern, British Continental Airways, are already flying over most of the route, while a third company plans to reach Sweden by a northerly route, and the subsidised firm will therefore have to work hard to secure its share of the traffic. A British firm will naturally be supported by British travellers and letter-writers, and in Denmark and Sweden, too, there is a pro-British sentiment which should help it.

Still, a subsidy was obviously a necessity if the company was to have any chance of holding its own, and the one-way mail contract will also help. As a matter of general principle, it is better to encourage air transport by mail contracts than by subsidy; but if the former plan is adopted it is necessary that the terms of the contract should be very attractive. At the moment a subsidy, however much we may dislike that expedient, is inevitable.

The Precedent

THAT controversy should arise out of the granting of the subsidy to one company was inevitable, and in our Correspondence columns this week there appears a letter which complains bitterly that both subsidy and mail contract should have gone to the same concern. Another company, the writer considers, ought to have had the mail contract.

Flight is perfectly impartial and holds no opinion as to which company most deserved the patronage of the Air Ministry. But the suggestion that official favours ought to have been distributed between two companies instead of being concentrated on one is not easy to support. Imperial Airways was brought into being as a result of the report of the Hambling Committee set up by Sir Samuel Hoare in 1922-23. It must be presumed that the present action of the Government has been governed by the principles laid down in that report, which governed the original grant of a subsidy to Imperial Airways.

It will be remembered that before 1923 there were three subsidised companies flying across the Channel. The Hambling Committee pointed out that under that arrangement the Government was, in effect, competing with itself. The report went on to say: "There was not sufficient demand for air traffic to offer the conditions essential to real competition, and the result of the permanent scheme was, therefore, to increase the number of British aeroplanes on the London-Paris route, with consequently increased expenditure on flying costs, insurance and depreciation, and to reduce the number of passengers per machine while the unnecessary cost of separate organisation and independent management was maintained. The benefit of competition under these schemes was therefore illusory, and until civil aerial transport has become more nearly self-supporting we do not think competition can be relied on, unless at an unnecessary cost, to stimulate its development. So far as efficiency of service is concerned, adequate incentive should be provided by the direct competition of foreign countries with large Government resources behind them."

Though some conditions have changed since 1923, the principles laid down in that report still hold good. It would be wasteful to dissipate Government help between two companies. If, however, those companies could see their way to join forces, as the cross-Channel companies did when Imperial Airways came into being, the British effort on the service to Sweden ought to be, on the face of it, appreciably strengthened.

Lord Rothermere Tells the World

IN an open letter appearing in various journals Lord Rothermere declares that British warships now lying in the harbours of Alexandria, Haifa and Aden are at Italy's mercy. They are as defenceless against the Italian Air Force as sitting rabbits against hawks. . . . "The latest Italian aeroplanes have a range of a thousand miles out and a thousand miles home. They carry two tons of bombs and fly at 250 miles an hour. Moreover, the time required in Italy to build an aeroplane is, according to my information, ten weeks. It takes much longer in England. Of these formidable instruments of warfare Italy is building between seven and ten daily. And in the Eastern Mediterranean at the present moment Italy has an immensely powerful force of aeroplanes, a high proportion of which are of great speed, range, and bomb-carrying capacity." . . . and, as if this so-called revelation is not sufficiently disturbing, Lord Rothermere actually goes on to say, and presumably believes, that . . . "These magnificent Italian aeroplanes, manned by pilots like those who flew with Balbo to Chicago, and equipped with engines such as gave Italy the world's air speed record, are the masters of the Mediterranean, dominating everything that floats or flies. While some of them were destroying the British Fleet at the eastern end of that sea, others could be raiding British shipping 200 miles west of Gibraltar out in the Atlantic."

The Schneider contests (as a result of which the Trophy remains permanently with Great Britain) have certainly taught us a wholesome respect for Italian aircraft, engines, and pilots, but we must admit that aeroplanes which can carry two tons of bombs at 250 m.p.h. for two thousand miles do fairly make our flesh creep. The Italians must have discovered some form of solargetic or lunargetic construction to produce such a performance. The Nimrods and Ospreys of our carriers, to say nothing of other forces which Sir Samuel Hoare hinted had been sent to the Mediterranean, would naturally be quite unable to protect our fleet. And, by the way, it is certainly interesting to learn from an authority who must not be doubted that the vexed question of whether air power can sink a fleet or not has at last been settled in favour of the air. Obviously, Sir Samuel Hoare was quite wrong when he said that if Italy should attack us we should retaliate, and probably with complete success. With such a force at his command, Signor Mussolini can feel no anxieties about the safety of his large army separated from its supply base by the Suez Canal, for, of course, British bombers would be powerless to damage the Italian supply ships on their way to the port of Masawah. It is so nice to think that worries on that score do not keep the Duce awake at nights.

The Douglas on the tarmac in front of the terminal building at Zurich—an example of clean and "obstruction-free" design which might be copied elsewhere. (*Flight* photograph.)

SWITZERLAND NON-STOP

Scientific Navigation on Swissair's London-Zurich Run : An Automatic Pilot in Action : Blind Approaches in the Alps : Modern Methods for Modern Conditions

By H. A. TAYLOR

AT no time since radio first came into use for air transport have navigational methods been so vital with interest and so fraught with change as they are to-day. To say that operational systems are in the melting pot is to state the obvious, but it is possible now to see, so to speak, what is actually in the pot and to realise what air line operations may be in ten years' time.

The Sperry in charge at 9,000 ft. over Rheims, while the pilot, Mr. Nieffenegger, looks on before returning to his charts. (*Flight* photograph.)

When the Swissair company stated, towards the end of last year, that its line between London and Zurich would be reopened as a winter service, few people realised the importance of the announcement. Without the help of the most modern equipment such a winter service could not be run with very much more than casual reliability. The route length is more than five hundred miles, almost the whole of which is covered non-stop. The meteorological differences at the terminal airports may be very considerable, and forecasts, in any case, cannot often be made with complete accuracy. Finally, the terrain at the southern end of the service is such that meticulously accurate navigation is essential.

Perfect Air Travel

On such a route the use of the modern ideal in transport types—a high-speed machine designed to operate at fairly high altitudes—becomes more than a practical proposition; it becomes an essential. Flying at anything from 8,000 to 18,000 ft. in the almost unexampled quiet of the air-conditioned cabin of a Douglas D.C.2, the passenger by Swissair obtains an impression of air travel as it should be. When, as is sometimes the case, the ground is not seen from the moment of leaving the airport, one who is privileged to be able to spend most of his time in the control cabin can be even more impressed by the thorough manner in which the machine's position is checked and re-checked and by the methodical way in which the very complete navigational equipment is used.

Each of the five Douglas machines used by Swissair is fitted with normal Telefunken two-way medium-wave radio equipment—for which, of course, both fixed and trailing aerials are used—a Telefunken direction finder which can be used with a visual and acoustic homing device where necessary, complementary blind approach equipment (the Lorenz system is installed and in regular use at Zurich airport), and a Sperry automatic pilot.

To one who is moderately familiar with operational methods on internal and European routes, two facts stand out. One is that the Swissair pilots make extensive

Waiting for permission to leave the tarmac at Croydon. The loop aerial can be seen above the control cabin as well as the oiled leather-coated spinners for ice protection. (*Flight* photograph.)

Overhauling one of the five Swissair Douglas machines in the Zurich shops, which are kept scrupulously clean and must be among the most up to date in Europe. (*Flight* photograph.)

and, indeed, almost exclusive use of their own D/F equipment for obtaining bearings and fixes, so that the machine is virtually "self-supporting." The other is that the automatic pilot does ninety per cent. of the flying. Mr. Walter Mittelholzer, the general manager, considers, in fact, that really accurate navigation in thoroughly bad weather would hardly be possible without its assistance, and explained that no trouble has been experienced with this equipment since the D.C.2s were put into service. As a pilot of very long experience—he was largely responsible for the technique which has been developed on the Zurich run and he always brings over one service every week—Mr. Mittelholzer's opinion carries weight.

Certainly, on an out-and-home trip made last week, I noticed that the automatic pilot was in charge up to the moment of each final landing circuit, and was actually used to bring the outward machine in down the short-wave beam at Zurich. Mr. Nieffenegger, the pilot, disconnected it only as the second marker beacon was passed. With its help the directional needle hardly flickered during the entire approach. Whether an automatic pilot is absolutely essential or not, it relieves the human pilot of his immediate responsibilities and allows him to concentrate on his navigation up to the very moment of passing the airport boundary—an important point in really bad weather conditions. In cases of emergency it is possible to override the Sperry without disengaging it.

Those who are not familiar with this automatic pilot may not realise that it can be set for all reasonable angles of glide and climb, that it will turn the machine on to a new course when this is set on the upper or "follow-up" drum of the directional gyro, and that it can be set to give, for instance, a spiral descent of any desired radius. Only for a big change of course is it really advisable momentarily to set the "bank" knob to suit the actual turn. Since gyroscopes have a little habit of precessing, the directional gyro must, as in the case of the normal blind-flying equipment, be re-set by means of a magnetic compass (two of which are used in the Swissair Douglas) at intervals of twenty minutes or so. The Sperry will, in fact, do almost everything but land the machine.

Normal European broadcasting stations are largely used for obtaining bearings. The Croydon, Le Bourget, Basle, Zurich and other D/F stations are used only for

checking purposes except during the last stages of a flight in each direction. In addition, shipping beacons, such as those at North Foreland and Cap Gris Nez, are often useful for obtaining fixes or bearings while in the Channel area. By a curious and happy coincidence, a straight line joining the corner of the prohibited area at Montbéliard and Croydon passes also through Heston and through the Droitwich broadcasting station, so that it is even possible to "home" all the way across France—due allowance being made for drift. The National programme can often be picked up by the operator while over the Swiss frontier.

In the ordinary course of events the radio navigation is carried out on one station at a time, bearings being taken regularly, the correct one to, say, the Eiffel Tower, being known for positions charted at fifty-kilometre intervals. A cross bearing from another station will provide an actual position when the lines are laid out on a special chart.

Since there are very few meteorological stations where free balloons are used to obtain the wind velocity at high altitudes, and since even these cannot give information when there is a low cloud layer, the Swissair pilots work with very little initial information and must obtain it for themselves as soon as the machine has reached operating height, and there are occasions when it is found to be more economical to fly at a height very much below that for which the machine is designed. A good deal of useful information is provided by the meterological flight at Duxford.

Among the many tables which are to be found in a Swissair pilot's notebook is one from which the power output and average petrol consumption can be obtained. Over Rheims, for instance, on the outward journey and at 9,000 ft., the two Wright Cyclones were showing a manifold pressure equal to 5.5 cms. of mercury at 1,650 r.p.m., and the corrected air speed was 168 m.p.h. In these circumstances the engines were working at 55 per cent. full power, and the consumption would be about 280 litres an hour. During the return flight, with time to spare, the corrected air speed was 150 m.p.h.; the manifold pressure was equal to 5.1 cms. of mercury and the engine speed was only 1,500 r.p.m. The engines were, in fact, using only 45 per cent. of their available power, and the fuel consumption would be reduced to 185 litres an hour. With the "dynamic dampers," which have recently been fitted to the Wright engines, the revolutions can be lowered without vibration, and Mr. Mittelholzer hopes that the fuel consumption, which last year averaged 340 litres an hour, will be reduced to about 200 litres an hour over long-period operations. A more than important point if the operating costs are to be kept down.

Although I had already seen and heard the blind-approach signals in a Ju.52 at Tempelhof, the landing at Zurich provided me with an interesting first experience of the Lorenz system in actual service. The conditions were bad enough to make the equipment extremely valuable though not essential—a landing by normal means had been made at Basle, and the Swiss Air Force pupils were making circuits at Zurich under a low ceiling. Nevertheless, my first sight of Dubendorf airport, Zurich, was of the terminal buildings as the Douglas crossed the last marker beacon, and at 800 ft.—the "entry" height—the ground was only discernible in patches.

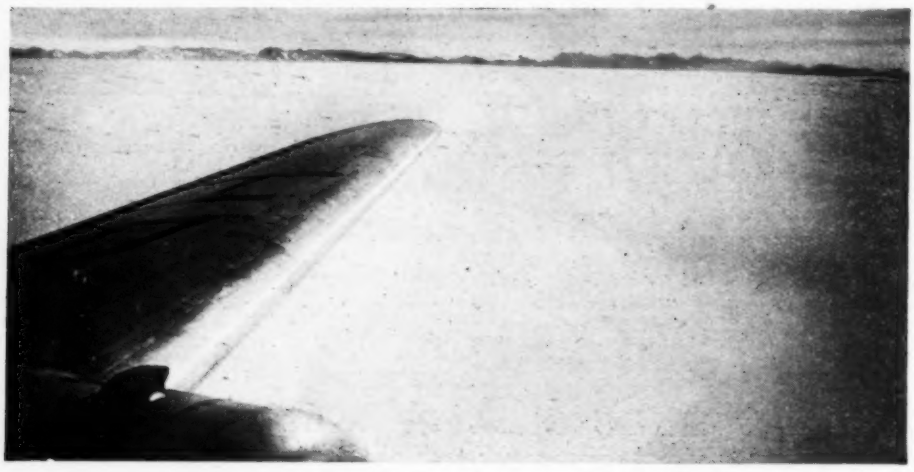
On a blind approach the pilot flies from Basle on a magnetic course of 95 deg., more or less following the Rhine and flying at 800-900 ft. After fifteen minutes or less he dons his earphones, switches on the short-wave receiver, and hears the first "right-of-course" signals, while his directional needle kicks in the appropriate manner. The instrument used by Swissair differs from the original Lorenz layout, inasmuch as the needles for horizontal and vertical navigation lie approximately at right angles on the same dial, with the marker beacon warning light in the centre.

Down the Beam

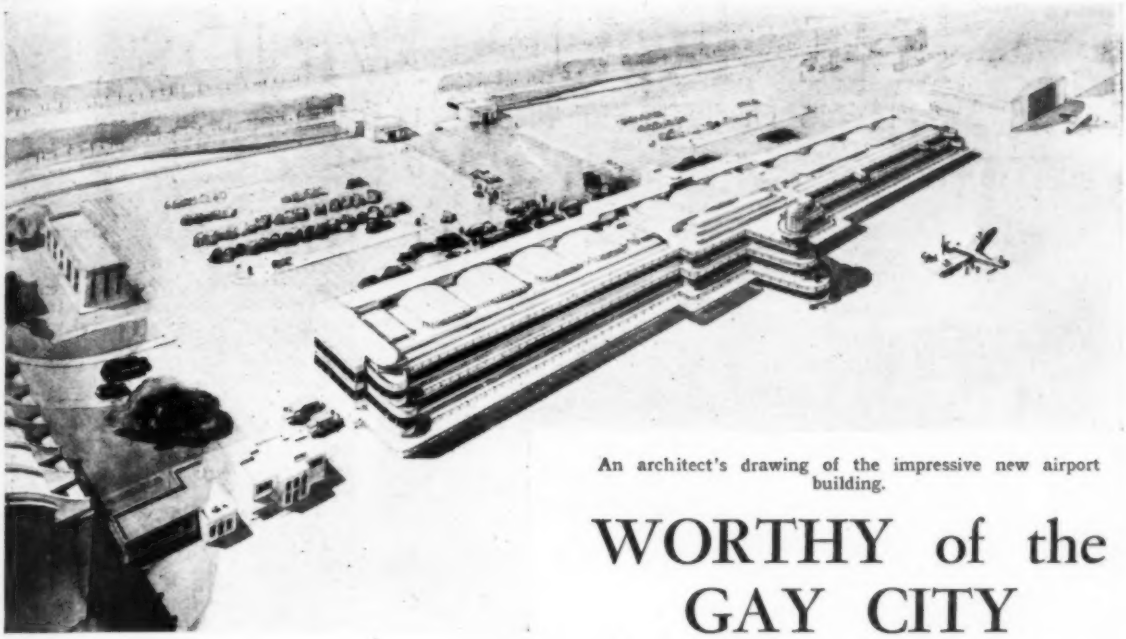
Adjusting his automatic pilot, he turns the machine slowly to the right until the continuous note is heard—the beam lies at 151 deg. magnetic—and then flies on down the beam until the first marker beacon is heard and the centre of his instrument glows red. Back come the throttles, and the position of the vertical navigation needle is noted. Thereafter his job is to keep this needle in the same position and to keep the directional needle steady. As the first, perhaps, drops he uses a little motor to remain in the beam path. Meanwhile, the radio operator is pumping the wheels down and is ready to pump down the flaps to their full extent. The Kollsman sensitive altimeter, already adjusted barometrically from the Zurich radio station, is watched at intervals to provide a check.

As the last beacon is crossed, with a loud series of earphone signals and a green glow on the instrument, the throttles are pulled right back, the flaps are pumped down, and the Sperry is disengaged. A moment more and the pilot hauls on the wheel for the touch-down.

It is all very simple in theory, but the process demands the strictest concentration by the pilot as well as a good deal of practice. Once again the success of a system which may be scientifically perfect rests on the human element. Nevertheless, the future of air transport depends on the perfection of fog-landing tactics.



When accurate navigation is necessary: A sea of cloud laps against the Alps; Basle lies below it.



An architect's drawing of the impressive new airport building.

WORTHY of the GAY CITY

Some Details of the Rebuilding of Le Bourget Airport, Now Beginning : Quicker Road Access to Paris

SOME details are now available regarding the extensive improvements which are now about to be made at Le Bourget. In brief, the present landing area is to be virtually doubled, and an extremely large and imposing new building is to be erected to house the administrative and passenger services.

Since the inception of Le Bourget as an airport in 1921 practically the whole of the easterly side has been occupied by the passenger buildings and the hangars of the various companies, while the other side of the field has been occupied by the military hangars.

Civil Flying Only

Under the new arrangement the whole of the airport will be devoted to civil flying. The military aircraft will be gradually withdrawn, and such of their hangars as are found useful for commercial purposes will be retained, while the others will be demolished. The pursuit squadron of the 34th Aviation Regiment has already left, and others will follow from time to time.

It is proposed to increase the area from the present figure of 500 acres to one of approximately 1,000 acres. A large section of vacant land amounting to 400 acres fronting the northerly boundary will shortly be acquired, and the brook known as La Morée, which now forms the boundary, will be covered over. The surface of the ground, which is rather low at this point, will be raised to the level of the rest of the field; it is estimated that a million cubic yards of earth will be required for the work.

It is also proposed to acquire an additional 100 acres at the south-westerly end of the airport, and for this purpose the Dugny road will be "pushed" farther to the south. With the acquisition of these two parcels of land the new field will give a maximum run of 3,460 yards. These extensions are being carried out under the supervision of M. Jean Cor, chief civil engineer to the Air Ministry.

The strikingly designed three-storey airport building (already illustrated in *Flight*, but reproduced again on this page) will be erected on the easterly side of the aerodrome, occupying the site of the small structure in which the restaurant and customs building are at present situated.

Designed by M. Labro, a well-known architect, the new station building will be constructed almost entirely of reinforced concrete, and will be of extremely spacious design, the rooms on each floor having a minimum height of 10 ft. The ground floor will be divided into two parts; the section on the right, entering from the tarmac, will contain the various booking offices, waiting rooms, etc., while that on the left will house the customs, baggage, goods and similar departments.

A restaurant, a large hall, and the airport management offices will occupy the second floor, while the third floor will be given over to air line offices and the airport traffic control services.

The frontage facing the airport is set back in the form of terraces so that each floor has its balcony, while a control tower surmounts a projection of the frontage midway along the building. Constructional work is now starting, and is expected to take fourteen months to complete.

Present means of access to the airport will be greatly improved, and in this connection considerable road alteration is being undertaken, part of the scheme embodying the construction of an *autostrade*, or high-speed motor road giving extremely quick access to and from Paris.

NEON FLASHES FROM 1½ VOLTS

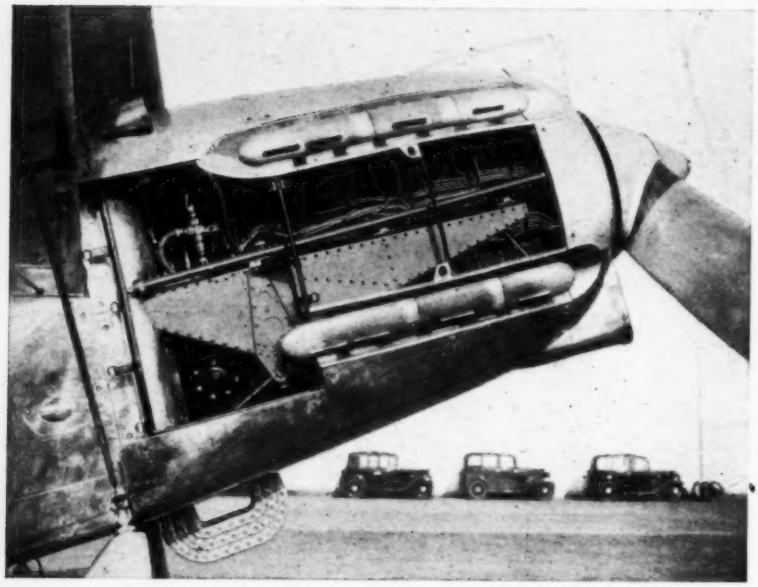
A LARGE number of aerodromes in the U.S.A. use an economical portable device for producing a series of neon light flashes from a 1½-volt dry battery. It is known as the Burgess Flasher, and is being handled in this country by The Burgess Products Co., of Barwell, Leicester.

The energy from the battery is supplied intermittently to the primary or input side of a specially constructed transformer. Interruption of the primary circuit is accomplished in the same manner as in a door bell. A special Burgess "Micro-Switch" is claimed to give a quick break and assure a clean, sharp flash. From the secondary or output side of the transformer, surges of high voltage—actually amounting to several thousand volts—are delivered to a neon tube.

For aerodrome use hail-proof glass protects the neon tubing in the head of the marker cone. Head fittings are of cast aluminium, and battery replacement is readily accomplished by removing the head. The cone is 31 in. wide, 33 in. high, and weighs 69 lb.

THE FOUR WINDS

ITEMS OF INTEREST FROM ALL QUARTERS



THRUST : In this view of the Napier-Halford Dagger III engine in the Hawker Hector, the sturdy bearers and the uncommon exhaust arrangements are visible. The Dagger III has 24 cylinders and develops a maximum of 805 h.p.

MISS JEAN BATTEN has been elected an Honorary Fellow of the Royal Empire Society.

Ratier has successfully adapted the C.P. airscrew to the *Moteur Canon*.

Picturesque registration letters noticed recently on a Danish aeroplane: OY-DUD.

The six Blackburn Shark torpedo spotter reconnaissance seaplanes for Portugal are nearly completed.

Students in the department of aeronautical engineering at Loughborough College are building a light biplane.

With two Wright Cyclone G-5 engines supercharged to give 800 h.p. at 11,500 feet, the new Douglas DC-3 does 219 m.p.h.

Messrs. Lincoln Ellsworth and Hollick-Kenyon, who were rescued by the research ship *Discovery II*, have arrived at Melbourne.

Some of the new Savoia Marchetti triple-engined 200 m.p.h. bombers are being used by the Italians in their Abyssinian campaign.

According to reports from Japanese sources, Soviet aeroplanes have bombed Japanese-Manchukuo troops on the Mongolian frontier.

Next Tuesday, in the B.B.C. National programme, "Conquest of the Air" series: Capt. J. Laurence Pritchard on "The Designer's Task."

Other speakers in this series will include Mr. Ivor McClure, Brigadier Gen. P. R. C. Groves, Air Cmdre. J. A. Chamier and M. Henri Bouché.

The authorities at Canton have ordered ten Boeing single-seater fighters.

A Vultee bomber is being demonstrated in China by a Curtiss-Wright representative.

Mr. David Llewellyn, who is flying an Aeronca to the Cape, reached Cairo on Monday afternoon.

The U.S. Navy has ordered 114 Douglas torpedo bombers; they are believed to be low-wing monoplanes.

The recently published register of French civil aircraft shows that on January 1 there was a total of 2,093 machines.

Of this total 730 were privately owned (there were 717 proprietors), 498 were the property of 208 flying clubs, 154 belonged to Air France, and 309 were operated by commercial concerns.

Twenty-five Years Ago

(From "Flight" of Feb. 18, 1911.)

"What no doubt must be regarded as the first time of using an aeroplane in actual warfare is reported in connection with the Mexican rebellion now in progress. Mr. Harry Harkness, on his Antoinette, under an arrangement with a patrol of American cavalry, which is watching the Mexican boundary to prevent any of the insurgents crossing into the United States, flew from San Diego, California, to Juana, a distance of about 40 miles, carrying with him a message to the patrol."

A New Dawn?

After sitting for about nine months the Special Airship Committee of the American Science Advisory Board (commonly known as the Durand Committee) has reported unanimously in favour of airships as practical commercial vehicles and for military (naval) purposes. It recommends a programme for their construction and use.

The Aerial Flivver Again

Mr. Henry Ford has been granted a Department of Commerce experimental licence for a new light aeroplane powered with a newly developed V-8 engine. Apparently it has dual control, and in addition to two passengers will carry 60lb. of luggage and 30 gallons of petrol. About seventeen miles to the gallon is quoted as the consumption figure which it is expected to achieve.

Hughes' Trans-American Record

The engine of the Northrop Gamma used by Howard Hughes to cross America in 9 hr. 25 min. was the latest Wright Cyclone, giving 930 h.p. for take-off. A special single-seater model, the Gamma averaged 263.5 m.p.h., and of the 690-gallon fuel load with which it took off from Los Angeles about 225 gallons were left in its tanks in New York.

PAROCHIAL TRANSPORT : This is the Rev. Father J. M. Coulture who, as mentioned in *Flight* of February 6, tends the needs of his flock by air. The machine is a ski-equipped Aeronca, on which the "sky pilot" owner has covered many thousand miles.

1936 VERSION

De Havilland Hornet Moth in its Second Edition Easily Recognisable by its Square Wing Tips

Comfort and good view in all essential directions are features of the 1936 Hornet Moth, which, with side-by-side seating, is equally suitable for touring and tuition. With a 130 h.p. Gipsy Major engine, the maximum speed is about 124 m.p.h. and the cruising speed 103-108 m.p.h., according to the degree of throttling. The attractive aerial views above were "posed" for *Flight's* photographer by Mr. H. Buckingham of the De Havilland Company.

Private Flying

Topics of the Day

Aptitude Testing

AT one time or another all manner of devices, both bad and indifferent, have been developed for training pilots on the ground. While many of them might give a pupil some idea of the actions of the controls, an apparatus which faithfully reproduced actual flying conditions would probably cost almost as much as a real aeroplane.

Nevertheless, it is possible to produce an instrument by which a prospective pilot's aptitude can be fairly judged and with which a mediocre pilot can learn to hasten his various reactions to signals which demand certain immediate and intricate movements of the hands and feet. Such an apparatus would be useful where a vast number of apparently suitable applicants must be sorted out—it is rather cheaper and certainly safer to grade them on the ground than in the air.

Certainly the Reid testing apparatus, for instance, has shown itself to give remarkably accurate forecasts of relative ability. It registers graphically the time taken to complete certain simple or combined manipulative responses to light signals and a study of a chart made from a series of these responses will show not only whether the pilot is quick and steady in his responses, but also whether these responses vary and whether a pilot is very sensitive to outside disturbances.

In assessing aptitude the examiner is much more interested in the steadiness of the resulting curve than in the relative shallowness which registers the actual speed of response. In other words, an accurate rather than a rapid response is demanded—though, of course, if both are exhibited so much the better.

The Reid Apparatus

WHILE at Desford recently I nervously submitted myself to a test in this apparatus—" nervously " because one always hates to be found out, and I felt that, whatever the apparatus registered, I could hardly be as bad as all that since in six years of gentle aviation I had broken nothing more than one tail-skid check wire. For that, however, I must thank an ingrained caution and the skill and patience of a number of different instructors.

In the case of the Reid apparatus the patient is faced with a couple of rows of red lights which must be put out, on one side or the other, according to the initial control position, by centralisation of the controls, leaving only the centre white lights glowing. Over-zealous movements cause him to overshoot and to light one or two red lights on the opposite side of the white lights. The best movement is, in fact, that which one would normally make, while, for instance, completing a slow roll—a rapid yet smooth one with perfectly graduated accelerations and decelerations.

In the Chair

MY chart, though fairly good in a general way—the mean times were quite a lot better than those determined by the R.A.F. Medical Research Laboratory as indicating average aptitude—told me a whole lot of disquieting and surprising things. The M.R.L. figures indicating " above average aptitude " were 3 seconds or less for the combined movement, 1 second or less for feet movements, and 1.8 seconds or less for the hands. My mean figures were 2.5 seconds, 1 second and 1.6 seconds respectively.

Beyond that there was little enough cause for congratulation, though the chart was not unduly mountainous save at one point—where a Klaxon horn was fired off. At this unexpected noise, which closely resembled my idea of the Last Trump, I lost all interest in the twinkling lights and looked about for five seconds or so with the idea of discovering what I had done. After some time I realised that I had *not* sat on a horn button by mistake, but that this incredible noise had been carefully engineered as part of the test. Anyway, that five seconds just appeared on the chart as Mount Everest in a contour cross-section at the beginning of an atlas—with the Welsh hills around it.

Unexpected Discoveries

TWO other features in my chart gave rise to interesting speculations. The stick movements were fairly smooth, but those from left to right were perceptibly less accurate than those in the reverse direction. The fact that these movements were the first to be made accounts for some of the " overshooting " indications, but it could only be assumed that the greater accuracy in the reverse direction was the result of the left-hand circuit rules. Nevertheless, I learnt to fly at an aerodrome where right-hand circuits were the rule.

The chart for my feet was both smooth and shallow, yet in the early days I was always told that I treated the rudder without respect and was advised to wear lighter shoes. Perhaps the continuous criticism drove me to concentrate on rudder movements. Foot control should have been abolished twenty years ago. Many people will remember the D.H. Moth which was specially made for the Chevalier Willy Coppens. This machine had a normal two-axis stick control surmounted by a wheel which operated the rudder. One or two people who flew it had little difficulty once they became accustomed to it.

Anyway, at the end of five minutes in this box of tricks I felt as I did after my first half-hour in control of all three axes under the hood and chasing a couple of little needles and a bit of coloured alcohol for all I was worth. Let no one say that physical exertion is necessary to raise body heat in cold weather. A fortnight ago I nearly boiled away—on a day with the temperature below zero—while practising approaches and landings in a strange aeroplane. Nor was the tail trimming wheel stiff!

INDICATOR.

FROM the CLUBS

Events and Activity at the Clubs and Schools

LEICESTERSHIRE

The sixth annual meeting of the Leicestershire Aero Club is being held in the clubhouse on Friday, February 21.

YORKSHIRE AVIATION

The second annual dinner and dance of the Yorkshire Aviation Services and Country Club was held at the Grand Hotel, Harrogate, on Wednesday, February 12.

C.A.S.C.

Fog prohibited flying at Fen Ditton last Sunday, although six members attended. Last Thursday about 300 guests and members attended a dance held in London.

TOLLERTON

For the week ending February 6 flying time was 13 hr. 45 min. Miss B. S. Birkin went solo. Thirty-and-a-quarter hours' flying was put in at Tollerton last week. Mr. W. Alton is taking a course of navigation, and Mr. J. B. Cooke has become an associate member.

REDHILL

There were four new members last week and 77 hr. 15 min. flying was recorded. Miss Harrison and Mr. R. F. Stone did their "B" licence night flying tests and the latter has now completed all the tests for that licence. Mr. H. Dumbleton took his "A" licence tests.

HANWORTH

SENOR Canas, who has been taking a blind flying course, has now passed his tests. Mr. R. Henderson has bought a Cirrus-engined Miles Hawk, which he is housing in the Club hangar. Flying times were reasonably good last week, even considering the poor weather.

NEWCASTLE-UPON-TYNE

During the fortnight ending Saturday, February 15, flying times aggregated 40 hr. 55 min. Dr. H. H. S. Brown and Dr. J. Morrice have made their first solo flights. Last Sunday a number of members flew and were favourably impressed by the B.A. Swallow, which has been at Woolsington on demonstration.

SOUTHEND

Club flying recommenced on February 1 with Mr. T. Nash as instructor. During the ensuing week the flying times were 15 hr. 20 min. dual, and 10 hr. solo. At the moment there are seventeen members under instruction, five of whom are nearing the time for their "A" licence tests. Six new members were elected during the week. All instruction is done on Cadets, and the rates for flying are dual 44s. and solo 32s. per hour.

SOUTH COAST

About twenty-four hours' flying was recorded during the week ending February 9. Mr. L. E. Kearney took his "A" licence and Miss Grant and Messrs. Evans and Jakeman became members. The landing competition on Sunday, February 9, was won by Mr. G. H. Miles. The week ending February 15 started with snow and finished with rain, but, nevertheless, the Club did sixteen hours' flying. Next Sunday the B.A. Swallow will be demonstrated. New members include Messrs. Fraser, Litvinne and Spurr.

LONDON

Last week, when flying times totalled 107 hr. 10 min., Mr. L. T. N. Harris became a member.

CASTLE BROMWICH

Mr. H. Bartholomew went solo last week, during which flying times amounted to 13 hr. 50 min. dual, and 6 hr. 30 min. solo.

PORTSMOUTH

Mr. G. Slater-Booth has gone solo, Mr. T. A. Boughey has passed his "A" licence tests, and Mr. L. G. Glanville has become a member. Last week's flying time, influenced by poor weather, totalled only 9 hr. 40 min.

IRISH AERO

Capt. A. M. Wells, R.N. (ret.) has been appointed secretary to the Irish Aero Club, which has opened offices at 12, Central Chambers, Commercial Buildings, Dublin. Through the courtesy of the Department of Defence, four officers of the Army Air Corps are acting as instructors pending the return of Mr. St. John Kearney from the East.

CAMBRIDGE

For the time of the year last week was a record one in the matter of flying time. More than 22 hr. were flown on Sunday, the total time for the week being just over 75 hr. New members included Messrs. Warren, Hay, Haley, Stone and Walker. First solos were made by Messrs. Walker and Blandford. It is hoped that eight new licences will be obtained during the next three weeks.

DUBLIN

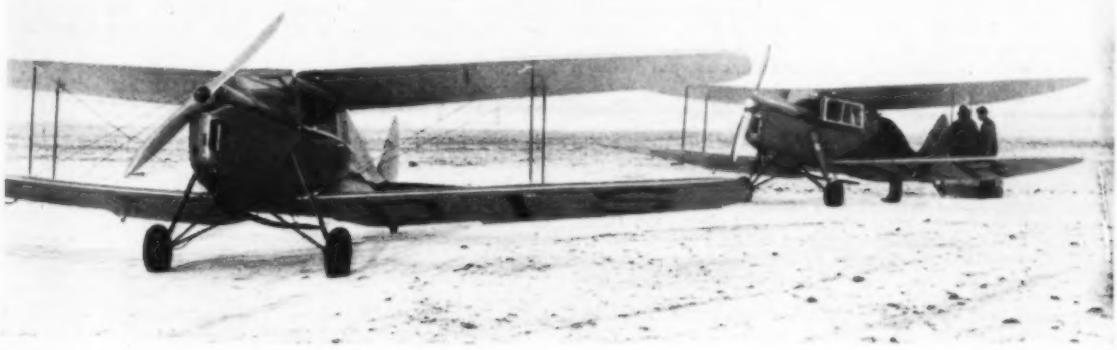
The first annual meeting of the Dublin Aero Club was held at Kildonan aerodrome, Dublin, last week under the chairmanship of Mr. R. G. Williams. Rules and regulations governing the Club were submitted and approved after minor alterations. The following officers were elected for the year: President, Capt. T. Hamilton; Vice-President, Mr. W. Gleeson; Committee, Miss Nora Wilson, Miss K. Wilson, Rev. Father Furlong, Mr. B. Egan, and Mr. L. U. Smith.

BORDER

A B.A. Swallow visited the Border Flying Club and impressed the members. The Club intends to purchase a cabin machine immediately and is considering the Hornet Moth or B.A. Eagle. The following became members last week: Messrs. W. and P. Thompson, Irving, Carruthers, Graham, Emmerson, Porter and Gillespie. Work has already started on the draining and levelling of the aerodrome. Telegraph wires, trees and like obstructions are being removed.

BROOKLANDS

Mr. A. J. D. Allan put in some successful initial flying on his *Pou* last week, the hard surface of the aerodrome permitting good acceleration. There will be a navigation competition on Sunday, February 23, and a Leap Year supper dance in the Aero Club on Saturday, February 29. Mr. Appleby found it impossible to get over to Brooklands to demonstrate his *Pou*, but should be there on March 1. The En-tout-Cas Company is taking over the draining and levelling of the aerodrome. The repair department had a sticky job last week in extricating Mr. W. Handley's Puss Moth from Rye marshes.



THE OLD ORDER CHANGETH: This photograph affords an interesting comparison between the 1935 and 1936 versions of the de Havilland Hornet Moth. Other pictures will be found on p. 197. (*Flight* photograph.)

Private Flying

READING

From Wednesday until the week-end there was no flying apart from the trip of Mr. Powis to Paris on Saturday and that of Wing Cdr. Stent to Bucharest to demonstrate the Hawk Trainer. Messrs. H. Blundell and A. B. Greenaway from New Zealand have become members and will learn to fly. Preparations are being made for the dance to be held on February 29.

CINQUE PORTS

Lympne suffered from an attack of high winds in the early part of the week and from low cloud later on. On Sunday a K.L.M. Fokker and two Envoys of Commercial Air Hire came in, unable to get to Croydon. Among the passengers was Mr. George Eyston, who came from Paris by Commercial Air Hire as he was unable to fly his own machine back. Mr. Provost came from Ostend on Saturday in a Stinson but was compelled to land at Littlestone.

Mr. Campbell and Mr. Garland have become members—the latter to do his night flight for the "B" licence. The Flying Committee, which was recently instituted, sat for the first time on Sunday to discuss matters relating to future landing competitions and the proposed rules for the Parsloe Cup.

NORFOLK AND NORWICH

The Club's scheme of deferred payment for flying has brought enquiries from all parts of the district. Mr. Bradley-Watson and Mr. Manthorpe have become pupils. On Sunday Mr. G. Gregory showed a number of films of aeronautical interest to the members.

CARDIFF

Mr. W. R. Bailey has been elected President of the Cardiff Aeroplane Club to fill the position rendered vacant by the resignation of Sir John Cadman. Mr. Charles Keen has been elected chairman. Flying time for January was 15 hr., and new members were Miss E. N. Coward and Mr. B. Taylor.

HERTS AND ESSEX

Flying returns for January show a total of 146 hr. 57 min. During the fortnight ending February 12 the total was 132 hr. 6 min. First solos were made by Messrs. A. R. Saward, R. C. Sankey and A. J. Veale. Mr. N. A. Blount has successfully completed the cross-country and night flights for his "B" licence. New members are Messrs. Y. D. Bhandakar, C. H. Walsham, S. R. Crook, D. T. Metadier, R. P. Beckman, J. C. Sleigh and Franz Morat.

An Aeronautical Essay

AT a recent meeting the Faculty of the North-western University School of Law, Chicago, Illinois, selected as a subject for the 1937 Linthicum Prize Contest an essay on "Carrier Liability in National and International Air Commerce (Including Liability to Passengers, Shippers and to Others for Personal Injuries and Property Damaged)." The first prize is $1,000, and there are other cash prizes. Full details are obtainable from The Linthicum Foundation, North-western University Law School, McKinlock Campus, 357, East Chicago Avenue, Chicago, Illinois.

Perth in Action

THE Airwork civil flying training school at the Perth municipal aerodrome commenced operations on January 27. Fourteen Tiger Moths out of the full complement of twenty have now been delivered, and the remainder will be flown up north in the course of the next few days. The month preceding the opening has been a race against time by the builders and contractors, who have successfully completed the work to schedule. Mr. P. J. B. Perkins is aerodrome manager on behalf of the Perth Corporation, and the chief instructor, Flt. Lt. C. Walter, will be assisted by Flying Officers A. E. Dobell, G. A. Donaldson, M. T. M. Hyland, A. W. Lawson, G. Mahony, R. Pierce, G. W. J. Jarrett and R. Rendle. Additional staff are Corpl. A. J. Streatfield (photographic instructor), A. Dyer (armament instructor), H. W. Simms-White (chief ground instructor) and J. R. Bayes (timekeeper).

Somewhat Slower

FLT. LT. R. L. R. Atcherley has qualified as a Flea-tamer by completing fifteen minutes on Mr. Appleby's insect. It says something for the docility of the Carden-Appleby *Pou* that seven orthodox pilots have now flown it without any form of breakage and without any "straights" to get accustomed to its action.

Rumours that British Airways are officially interested in the *Pou-du-Ciel* are absolutely unfounded. Nevertheless, Mr. P. W. Lynch-Blosse, technical adviser to that company, seeing the Carden-Appleby *Pou* briskly refuelling its four-gallon tank at the Heston rate of twenty-five gallons a minute, decided he would fly it. He confesses to a tonnage of 205 lb., and seldom flies on less than three engines, but the *Pou's* keeper said that did not matter. He stayed up for ten minutes, put it down neatly, and expressed satisfaction.

The Viceroy's Cup Race

ELEVEN pilots entered for the 1,520-mile Viceroy's Cup race, which was won by Lt. Misri Chand, of the 14th Punjab Regiment, with a D.H. Puss Moth at 116.5 m.p.h. The second place was also taken by an Indian, Mr. G. V. Gadgil, of the Karachi Aero Club and flying a Moth. Of the eleven entrants, ten started and nine completed the two-day course, Mr. N. M. Guzdar, with a Miles Hawk, making a forced landing some 200 miles from Madras.

Previously, Lord Willingdon, who had watched the finish and presented his own cup, opened the Willingdon aerodrome buildings at New Delhi.

The European entrants in the race included Sir Alastair MacRobert and Messrs. N. Vintcent, C. Gardner, R. V. Fowler and A. Muir.

Gropler Gets There

SUBJECT to confirmation it is understood that Mr. R. W. Gropler—who cabled Airwork from Australia to order a three-seater Klemm, left for Adelaide with high hopes, about eighty hours of solo experience and extra tankage by Airwork, and was lost sight of, arrested, sabotaged by hob-nailed continental policemen treading through wing and beset *en route* by other trials too numerous to mention—reached Darwin about a fortnight ago. Further reports say he has got to Sydney and beyond, so he should be home by now.

Touring in Jugoslavia

THE Automobile Association and Royal Aero Club announce that, as the result of representations made to the Jugoslavian Government, the formality for obtaining permits has now been abolished there for British touring aircraft.

Jugoslavia has long been a party to the International Air Convention of 1919, but the Government has hitherto insisted that a permit should first be obtained by nationals of other Convention countries wishing to fly through their territory. This anomaly has now been removed, and British air tourists may enter Jugoslavia without previous formality, though valid passports and visas are, of course, still necessary.

In Ireland Last Year

THE number of privately owned aircraft in the Free State did not greatly increase last year, though the total number of registrations made with the Department of Industry and Commerce is now twenty-nine.

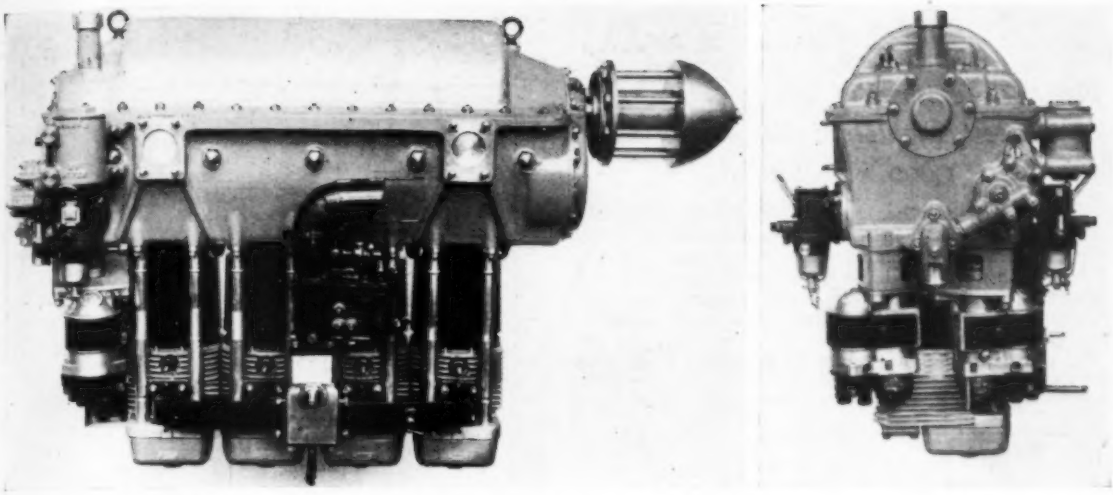
The Irish Aero Club continued its operations at Baldonnel aerodrome and increased its membership. It has 120 members, thirty of them pilot-members. Flying time during 1935 totalled approximately 575 hours. Financial difficulties continued to handicap this organisation, but new plans have been drafted to overcome the problem. Mr. Charles F. French, who was with the club for several years, resigned his position of chief instructor. He was replaced by Mr. E. J. Dease, instructor of the Cork Aero Club, who resigned at the end of year to take up duty under the Air Ministry. Mr. John St. John Kearney has now been appointed to the vacant position. One of the "expeditions" by the club was a flight by six of the members to Carlisle for the Border Aero Club's dance.

The Cork Aero Club made some progress, and established a branch at Killarney. This club has an enthusiastic and growing membership.

Pou-du-Ciel machines have attracted the attention of a number of enthusiasts in the Free State and about a dozen are under construction. A Flying Flea Club is being formed, and regulations regarding the flying of these aircraft are being drafted by the Government.

In January, 1935, Everson Flying Services disposed of Kildonan aerodrome, Finglas, to Dublin Air Ferries, Ltd., an organisation operated by Mr. G. A. R. Williams and his wife (formerly Lady Heath). The company was inaugurated in March by the Lord Mayor of Dublin and since that time ten pilots trained at Kildonan have obtained their "A" licences. The company's machines carried out a large amount of charter flying, and the total time flown on this work was over 600 hours.

The latest official figures show that fifty-seven "A" licences and fifteen "B" licences have been issued.



Two views of the latest Cirrus Minor which incorporates a number of improvements.

YOUNGEST of the CIRRUS FAMILY

Latest Version of the Cirrus Minor Passes its Type Test : Normal Output of 82 h.p. : Fuel Consumption 3½ to 4 gall./hr. at Normal r.p.m.

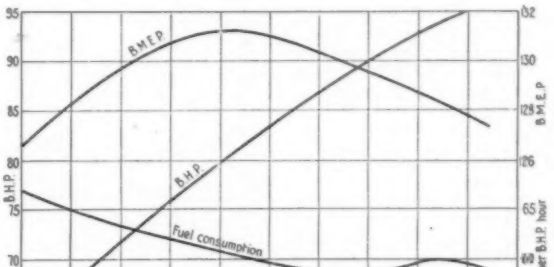
SINCE the Cirrus Minor engine was described in *Flight* of February 28 last year a number of alterations have been made to this interesting little unit which—subject to Air Ministry confirmation—has passed its type test. The main alterations found in the latest production are described in the following notes.

The crank case bearer feet faces are now supported by two webs instead of one; the crank case joint face has a lip on it for greater strength; the oil drain fixture at the rear has been so made that it carries cleats for the interconnecting pipes between the petrol pumps; the oil filter body has been altered so that the thermometer bulb aperture is deleted (the reading is now taken from the oil tanks); the valve gear box covers are attached by a single locking device instead of two domed nuts; and the oil drain at the front end of the crank case has been altered so as more easily to provide for the drain pipe to come away, miss the side chute and fall away to the rear of the engine at the correct angle. A three-piece unit is now used for the induction manifold, the centre portion being an Alpax heater box and carburetter support, and to this two branch pipes are bolted. These latter, incidentally, are interchangeable and may be used in either position, simplifying the question of replacement in the event of damage. Domed plugs are used on the sides of the crank case to blank off the oilways through the webs to the main bearings. Another minor alteration is the redesigned propeller boss which has a locking plate at the rear to prevent the bolts from turning.

One of the early Blackburn Bluebirds has been used as a flying test bed for the Minor. Some idea of the compactness of the little engine may be gathered from the fact that it covers only a little more than half of the engine space available in this machine and about two-thirds of the depth previously necessary with a larger engine.

The latest figures taken for the Minor show a fuel consumption of 3½ to 4 gall./hr. at normal r.p.m., and 6 to 6½ gall./hr. at maximum r.p.m. The oil consumption is 1 to 1½ pints/hr., and the weight, less airscrew boss, bearer feet and petrol pumps, is approximately 195 lb. At normal r.p.m. (2,300) the Minor gives 82 h.p., and at 2,600 r.p.m. 90 h.p. is available. The compression ratio is now 5.8:1.

Accessibility has been given particular study and there is nothing at the rear which requires any great amount of space for withdrawal. The timing gear cover at the front end, which is split on the crankshaft line, can be taken away with the crank case cover after removing four nuts. The timing cover, incidentally, disturbs no gears when removed. Other interesting features are the magnetos and fuel pumps which are operated from separate drives, one on each side at the rear, the magneto shaft carrying a cam which operates the fuel pump on that side of the engine. In the unlikely event of a gear failing, or a magneto or pump damaging the spindle, a supply of petrol would still be forthcoming and one magneto should still continue to function.



The power curves obtained during recent tests of the Cirrus Minor.

The elimination of the holding-down studs for the cylinders is claimed to banish the most general cause of cylinder head distortion, namely, the risk of uneven tightening of the four nuts.

Complete overhaul is recommended after 600 hours. It is an interesting fact that two Minors will consume no more petrol than one engine of the Major class, and that they give a total power output of 33⅓ per cent. more power without any increase in the weight per horse power.

A batch of fifty Minors is in hand at the moment and the manufacturers will soon be in a position to supply the engines at short notice. One foreign Government is building a machine round the Minor, a number of manufacturers at home and abroad are doing likewise, and others are altering existing machines.

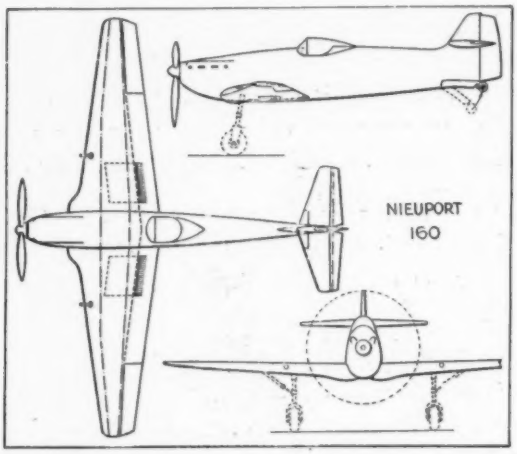
The makers are the Cirrus-Hermes Engineering Co., Ltd., Brough, Yorkshire.

A 300 m.p.h. TRIO

Notable Features of Three of France's Newest Fighters : One With a 1,000 h.p. Radial

IN common with other powers, France is finding that continual and large increases in the speed of her fighters are imperative. Preliminary details of some of her latest efforts in this line have lately been released. It is impossible, unfortunately, to make comparisons—apart from those of general design—with such machines as the Hawker F.36/34.

The machines concerned are products of the Loire, Nieuport and Dewoitine concerns, and all are now being subjected to preliminary tests. Each is a low-wing cantilever mono-



plane, but whereas two—the Nieuport and the Dewoitine—have Hispano Suiza liquid-cooled vee-type engines, the Loire makes use of the latest Hispano radial—a fourteen-cylinder two-row type known as the 79-Ha and giving a maximum of over 1,000 h.p. The Nieuport originally mounted the X type Hispano, but this is now being changed for the more powerful "Y," which, in its present standard form, delivers 860 h.p.

For armament the Loire—which bears the type number 250—carries a pair of 20 mm. quick-firing *canons* and two small-calibre machine guns. All four guns are believed to be mounted in the wings, the machine guns being synchronised to fire through the airscrew arc. Each of the two remaining machines has a *canon* between the cylinder banks of its engine and a pair of machine guns in the wings.

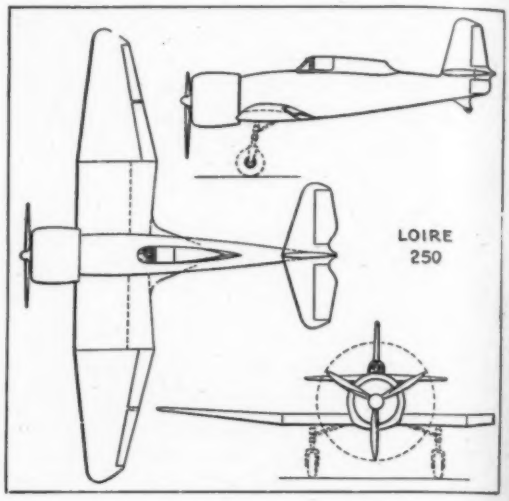
Due to their high-powered engines these machines—particularly the Loire—have a short endurance, and can probably remain aloft for little more than one hour at full throttle. They must, consequently, be grouped in the interceptor category.

Another problem consequent on the installation of such large engines is the size of the radiator needed. The Dewoitine engineers have put theirs in the nose of the machine, permitting a smooth airflow beneath the belly, but in the Nieuport design there are surface radiators, with which the Nieuport company has had considerable experience. This type of cooling system was, in fact, embodied on the parasol monoplane which they entered in the last French competition for single-seater fighters.

For preliminary test work the machines have wooden airscrews, but these will eventually be replaced by three-bladed C.P. types, those for the liquid-cooled engines being of a special Ratier design permitting the shells from the *moteur canon* to pass out through their bosses.

The pilot in each machine is situated approximately over the trailing edge of the wing and is provided with a cockpit enclosure. That in the Loire is of unusual formation, and although not apparent in the G.A. drawings is, according to one photograph, completely transparent over its whole length.

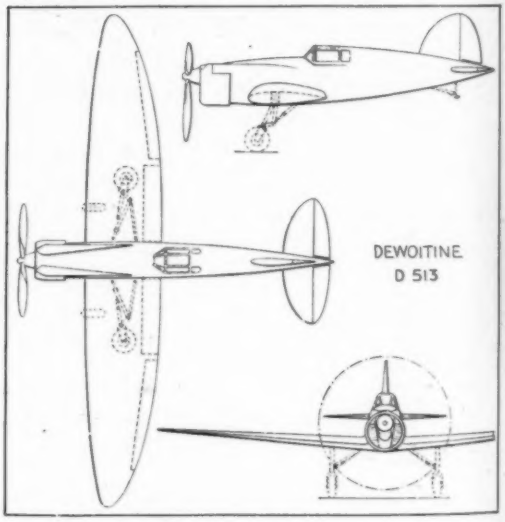
A retractable undercarriage is incorporated in each case,



and a very neat retractable tail wheel is a feature of the Nieuport. Complete constructional particulars are lacking, but it is known that the Dewoitine has a single-spar wing. It goes almost without saying that trailing-edge flaps are incorporated in the designs.

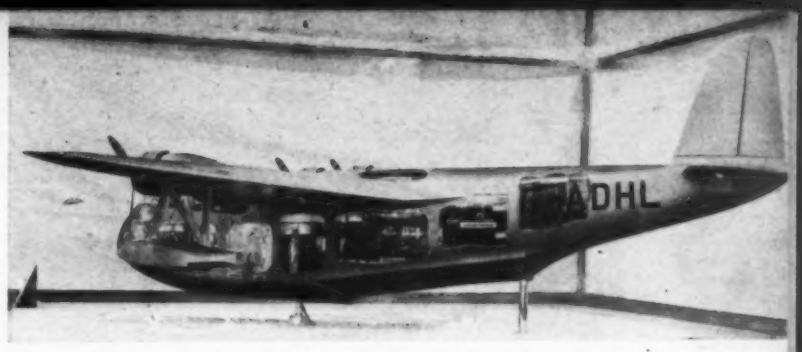
Estimated performance figures are as follows:—Loire 250: maximum speed, 300-304 m.p.h.; landing speed, about 62 m.p.h.; climb to 16,400 ft., 5 min. Nieuport 160: maximum speed, 273 m.p.h. with the Hispano 12X and 300 m.p.h. with the 12Y. Dewoitine D.513: 298 m.p.h. at 15,900 ft.; 247 m.p.h. at sea level; climb to 13,120 ft., 5 min. 6 sec.; climb to 26,246 ft., 12 min. 30 sec.; ceiling, 37,399 ft.

We are indebted to our contemporary *L'Aeronautique* for the general arrangement drawings reproduced on this page.



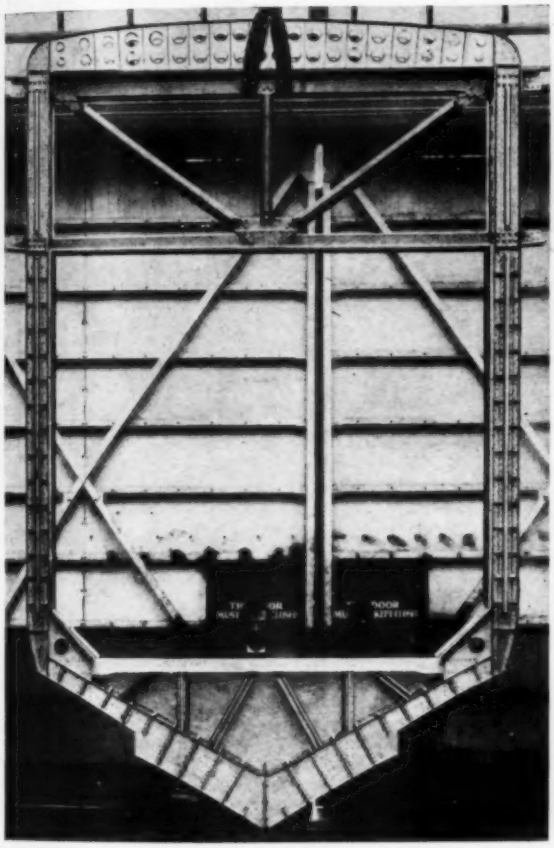
Elektron Progress

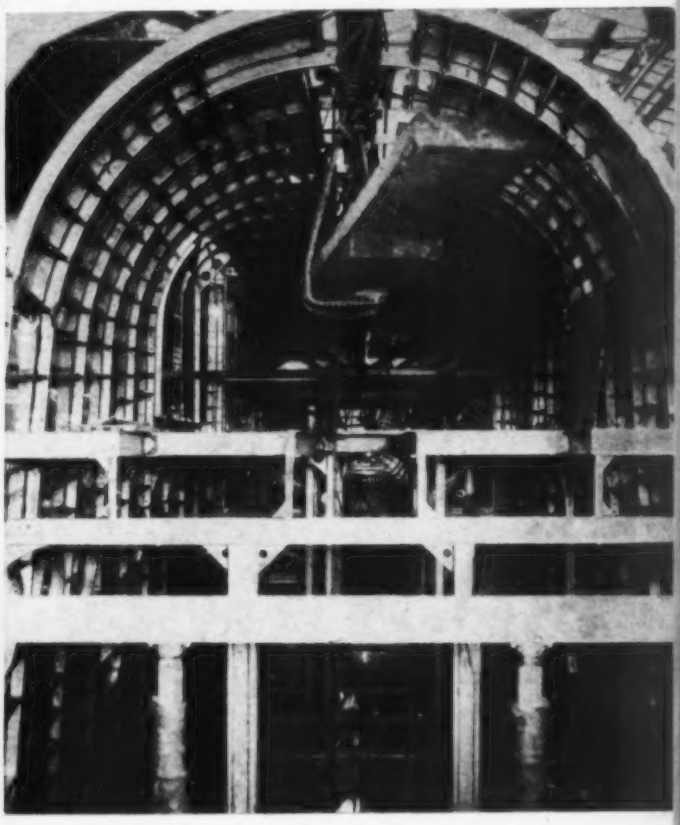
TO say that Elektron is becoming even more widely used in the aircraft industry (in common with many other lines of activity) is, perhaps, to point out the obvious; but if any substantiation of the fact were needed we have it in the news that Magnesium Elektron Limited—an associated company of F. A. Hughes and Co., Ltd., who introduced this famous alloy—have secured a site at Clifton Junction, near Manchester, where a new plant for the production of Elektron is now in progress of erection. This plant will have an output sufficient to meet all present demands and its capacity will be maintained at a level sufficient to cover future needs, thus rendering users entirely independent of imported supplies. It is anticipated that the new factory will be in full production by September.



First Illustrations of the new flying boats being built at Rochester are now published. Some of the constructional features are revealed and commented upon in this and the next page.

THE EMPIRE FLYING BOATS



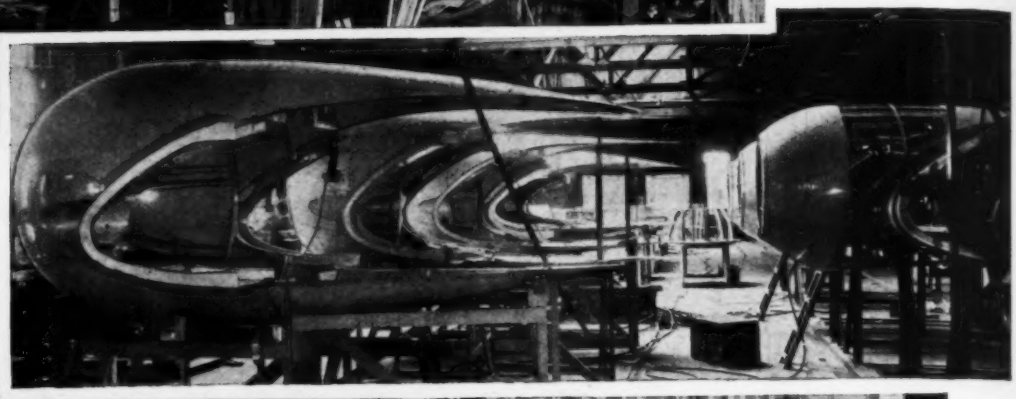


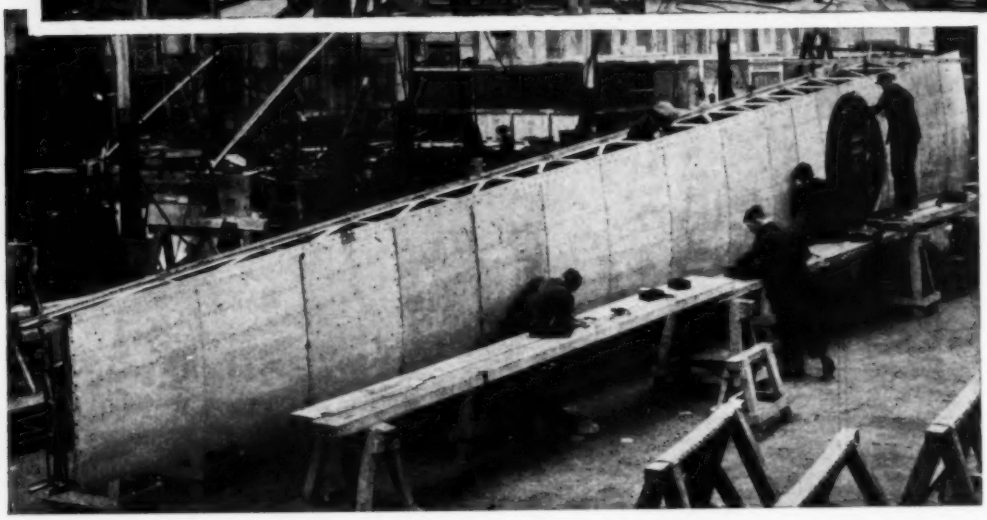
The frame in way of rear spar is shown on the left. Note the straight sides and small beam-depth ratio. On the right, a view inside the hull of boat No. 1, looking aft. Below is a view of the cantilever tail.

WITH remarkable speed the first batch of the large number of flying boats which Short Brothers are building for Imperial Airways are taking shape in the Short works at Rochester. The photographs show some of the structural features, and reveal the fact that considerable departures from what has hitherto been Short practice have been made in the Empire flying boats.

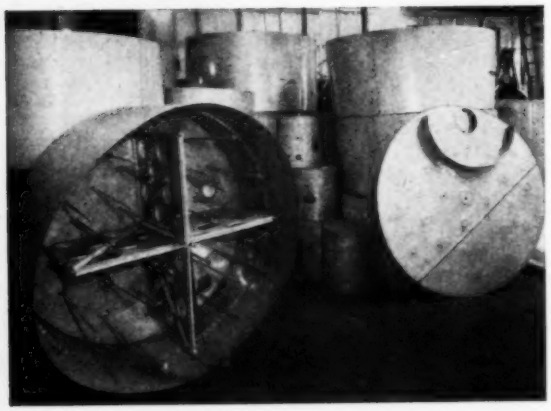
One of the most notable changes in design is the change from the flaring chines which characterised all early Short boats to vertical straight-sided construction. The photograph of one of the spar frames shows that the ratio of beam to height is much smaller than in previous Short boats, one result of which will be extra head room in the cabins. Doubtless the reduction in stability will be made up by using large wing tip floats. Generally speaking, the system of construction is similar to that which has given such excellent results in Short boats for many years, but the

On the stocks. A view in the Rochester works, showing hulls 1 to 5.





The "box" section wing spar of one of the first boats in course of construction. Above that, the engine nacelles for boat No. 1 nearly completed, with others in jigs. The details of the wing construction are somewhat similar to those tried out in the Short Scion.



Cylindrical petrol and oil tanks. Note the baffle plates, and the numerous tie rods which brace the tank ends.

extensive use of flush-riveting will give a neater finish.

In the wing construction very material changes are found. Use is made of what is virtually single-spar construction, the spar being in the form of a large "box" of approximately rectangular cross-section, to which leading and trailing edge portions are attached. The wing is a pure cantilever beam, and the tail surfaces also are without external bracing. The wing span will be no less than 114 ft.

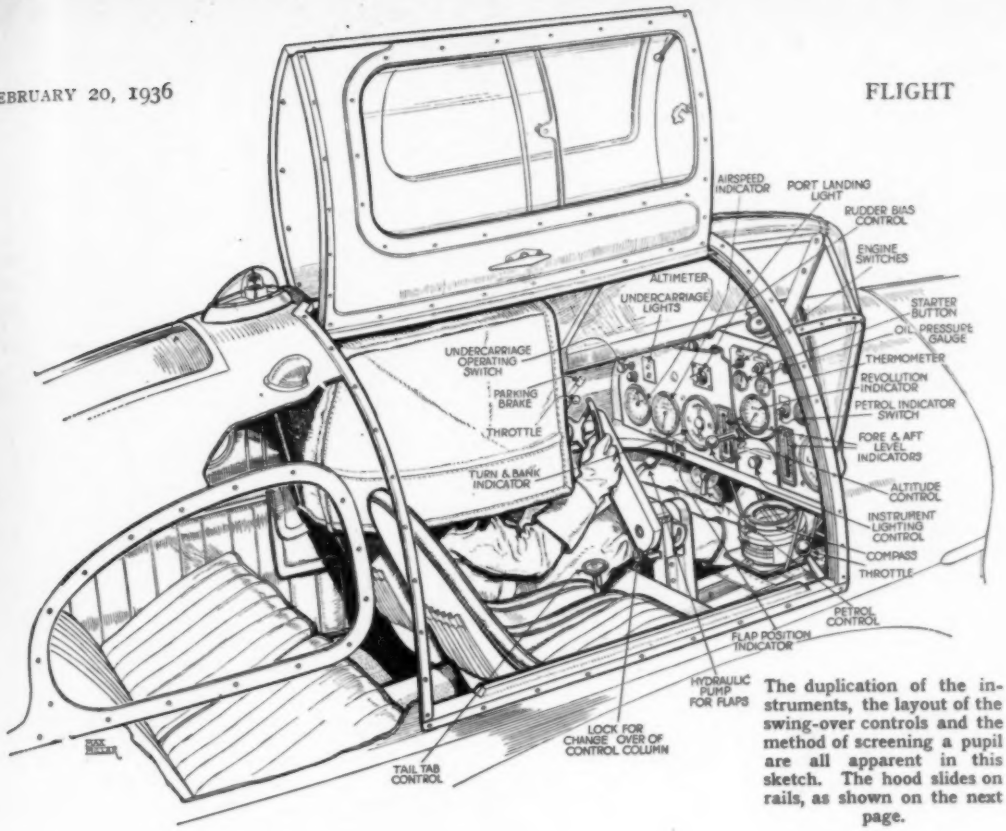
The four Bristol engines will be carried in streamline fairings on the leading edge of the wing; the picture of the engine nacelles shows the shape of the fairing.

When fully loaded, the Empire boats will weigh approximately 17.5 tons, and 3.5 to 5 tons will be available for pay load on normal stages. With a smaller pay load, and more fuel, the range can be increased to 1,500 miles.

Another "Pou" Unit

A FOUR-CYLINDER horizontally opposed air-cooled Coventry Victor engine is to be used in a *Pou-du-Ciel* which is under construction at Cheltenham. This is being built by the Cheltenham Light Aircraft Club, which was formed on September 12 last year.

The reason for the delay in production is the decision against the original intention to build "according to the book." Experiences of others have been taken into account, and while the *Pou* retains the features of M. Mignet's specification, a number of modifications have been incorporated. These include an increased wing-span and redesigned fuselage to take the new engine, which, at the same time, gives the machine a more orthodox appearance.



The duplication of the instruments, the layout of the swing-over controls and the method of screening a pupil are all apparent in this sketch. The hood slides on rails, as shown on the next page.

LEARNING in LUXURY

The Miles Nighthawk : A Cabin Monoplane Built Primarily for Instruction in Instrument- and Night-flying Training

WITH an eye constantly on the market for training aircraft, Phillips and Powis Aircraft, Ltd., have lately put into production a new monoplane known as the Nighthawk and intended for tuition in instrument flying and night flying. The new machine is likely to interest clubs which have been approved by the Air Ministry for blind-flying training, air lines which are undertaking the instruction of their own personnel, and schools which obtain training contracts from air lines. The Nighthawk is believed to be the first cabin machine in this country equipped specifically for giving instruction in instrument flying.

Basically, the machine may be regarded as a derivation of the Falcon. The first two to have been built are fitted with the 200 h.p. D.H. Gipsy Six, but the 130 h.p. Gipsy Major is an alternative power plant.

Structurally, the machine follows standard Miles practice; that is, it is of wood with a box-type fuselage and two-spar wings with plywood covering taking the drag and torsional stresses.

Side-by-side seats are provided for the pilot and pupil; there are dual controls, and either half of the cabin can be shut off from the other by an ingenious hood which "blinds" the pupil to everything except his instruments. When this hood is in use the view from the instructor's seat is still adequate, and his range of vision extends right across the machine. The exact method of "bagging" the pupil is shown in the drawings above and on the next page. The hood which covers his head is divided at the front and secured by press studs; when he wishes to emerge from it he undoes the flap and slides the whole hood back on rails.

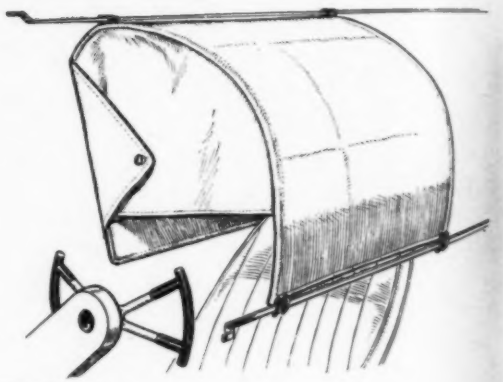
In order that instruction may be given in all types of controls as fitted to various machines, three alternative forms of control may be installed. One is a central column which can be operated easily by either occupant, the second is a "Y" type column, and the third, also of "Y" formation, is provided with wheels for aileron control.

The seats are arranged to take seat-pack parachutes, and the exits have been designed with a view to quick release in an emergency. Behind the seats a large space is available and might be used for camera equipment, wire-

This is the prototype Nighthawk, with a Gipsy Six engine, prior to being tested by Mr. Miles. (*Flight* photograph.)

The doors of the Nighthawk are designed with a view to quick exit in an emergency. (*Flight* photograph.)

This *Flight* sketch shows the hood which can be unbuttoned and slid back.



less installation, and drift or bomb sights. Actually, the all-up weight permits an extra pupil to be carried behind the instructor, where he could take notes of mistakes made by the learner in the front seat. The blind and night-flying instruments, of course, are duplicated, one set being on each side of the instrument panel.

The leading edges of the wings contain Harley landing lights (which can be pivoted and rotated from the cockpit), and the trailing edges have Miles hydraulically operated flaps to give a steep angle of approach and low landing speed. Normal navigation lights are fitted. The undercarriage is of conventional Miles design with ball-bearing wheels and long-travel legs and incorporate the "trousers" which have become standard on Miles designs.

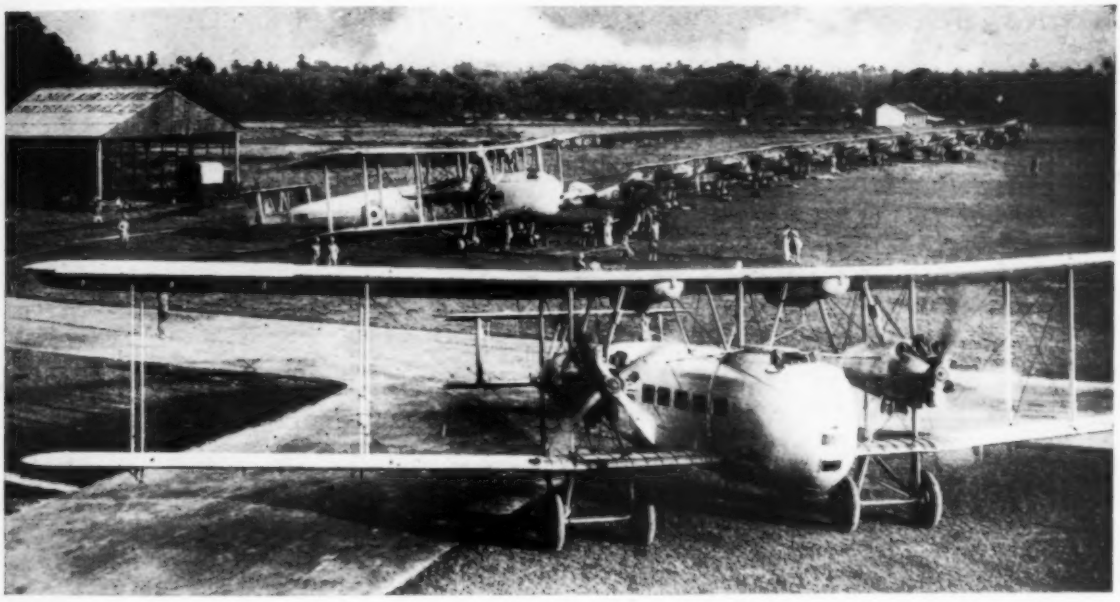
The following performance figures are obtained with the Nighthawk fitted with the Gipsy Six engine: Maximum speed, 175 m.p.h.; cruising speed, 155 m.p.h.; climb to 1,000ft., 1 minute; stalling speed, 50-55 m.p.h.; ceiling, 23,000ft.

A WARRIOR'S PROWESS

THE NEW HAWKER HECTOR army co-operation biplane in the hands of Mr. P. Lucas breaks formation with the evergreen "-MR" flown by Mr. Hindmarsh and carrying *Flight's* photographer. Other photographs of the newcomer appear elsewhere in this issue.

THE ROYAL AIR FORCE

SERVICE NOTES AND NEWS — AIR MINISTRY ANNOUNCEMENTS



THE BAGGAGE TRAIN : Two Vickers Valentias carried the equipment of this Hart squadron on its flight from Risalpur to Singapore and back. Here they are seen at Dum Dum, near Calcutta.

WINTER AIR EXERCISES

Air Marshal Sir John Steel, K.C.B., A.O.C., A.D.G.B., has decided to make the novel experiment of holding small-scale air exercises in winter conditions so as to test their effect on control and intelligence organisations. The exercise was timed to start at 1,500 hours on Tuesday, weather permitting, and to last continuously for twenty-four hours. No anti-aircraft or searchlights units took part, and only a small section of the ground organisation was used, manned by R.A.F. personnel and by the Observer Corps.

The Air Officers Commanding Central and Western Areas (Air Comdre. Boyd and Air Vice-Marshal Playfair) had at their disposal seventy-two bombers, while Air Vice-Marshal Joubert de la Ferté opposed them with seventy-two fighters. The day targets were Biggin Hill and Hornchurch aerodromes and Dagenham, and the night targets were Queen Mary Reservoir Waterworks, Ponders End Railway Station, and the Ford Works at Dagenham. The night raiding, however, was kept down to a minimum.

FOREIGN OFFICER ATTACHED

Capt. Napakas, of the Siamese Military Air Service, was attached to No. 1 School of Technical Training, Halton, for the period February 3 to 15.

CIVIL AVIATION GROUND ENGINEERS' LICENCES

Subject to the exigencies of the service, officers and airmen who desire to obtain the civilian ground engineer's licence will be permitted to sit, provided that no expense to public funds is involved. Airmen are advised to take the examination prior to transfer to reserve or discharge, as the possession of a ground engineer's licence enhances their prospects of obtaining employment in civil life. The Air Navigation (Consolidation) Order, 1923, and the Air Navigation Directions, 1932 (A.N.D.11) and amendments give details of the duties and qualifications of ground engineers. These publications may be obtained direct from H.M. Stationery Office, Adastral House, Kingsway, W.C.2, or through any bookseller at a small cost. All applicants are expected to have obtained and studied these publications before presenting themselves for examination.

R.A.F. BENEVOLENT FUND

The usual meeting of the grants committee was held at Iddesleigh House on Monday, February 10. Mr. W. S. Field was in the chair, and the other members present were: Mrs. L. M. K. Pratt Barlow, O.B.E., Wing Cdr. C. E. H. James, M.C., and Air Vice-Marshal C. A. H. Longcroft, C.B., C.M.G., D.S.O., A.F.C. The committee made grants to the amount of £348 13s. 5d. The next meeting was fixed for February 24.

AIR OBSERVERS

The Air Council have had under consideration the scheme for the selection, training and qualification of air observers, and have decided to make the following modifications, having regard to the greatly increased requirements under the accelerated expansion programme and to the experience which had been gained in selecting and training air observers under this scheme. The modifications are of a temporary character and will be subject to review from time to time.

Since ex-boy entrants of the requisite seniority will not be available for some years, the field of selection amongst ex-apprentices will, for the present, be widened by increasing the proportion of air observers drawn from the trades of fitter (armourer) and wireless operator mechanic and decreasing correspondingly the proportion drawn from the trades of armourer and wireless operator.

The field of selection will also be increased by reducing from six to four years the minimum period of service to be rendered prior to recommendation for training as air observer.

In view of the reduction in the minimum period of service the provision as regards promotion to corporal is cancelled. In future, air observers will be promoted to corporal on completing six years' service, or on remustering (if they have already completed six years' service) or, if earlier, on being confirmed as air observer after satisfactorily completing the probationary period.

Air observers employed in fighter squadrons will not be required to undergo squadron training in photography and may be confirmed without having qualified in this subject.

HALTON-BELGIUM TOURS—A REUNION

A reunion of the ten Halton-Belgium Tour parties (1926-1935) is being held at High Leigh, Hoddesdon, Herts, during the week-end, March 20-22. All members of the ten parties are invited to attend. Full particulars may be obtained from Mr. A. C. Kermode, The School, R.A.F., Halton.

FLYING ACCIDENT

The Air Ministry regrets to announce that F/O. Alfred Owen Douglas Cox, of No. 60 (Bomber) Squadron, lost his life in an aircraft accident which occurred near Etah, United Provinces, India, on February 8. F/O. Cox was the pilot and Corpl. Archibald Charles Wood was the passenger. Corpl. Wood was injured.

CRUISE OF No. 205 (F.B.) SQUADRON

On Monday, February 10, three Short Singapore boats of No. 205 (Flying Boat) Squadron left Singapore base on a cruise to Japan. This is the first occasion on which a squadron of the R.A.F. has paid a visit to Japan, and the destination of the Singapores is the seaplane station of Kasumagaura, which should be reached on 25th inst. Wing. Cdr. C. L. Scott, D.S.C., is in command of the cruise, and he is accompanied by twenty-four other officers and airmen. Air Comdre. Sydney W. Smith, A.O.C., Far East, travels on one of the boats. The itinerary of the outward journey is Kuching, Kudat (in Sarawak), Manila (Philippines), Hong Kong, Amoy, Shanghai, and Kagoshima. The return flight will be to Hong Kong and thence by Kam Ran Bay in Cochin China to Singapore. The total distance will be about 7,000 miles.

ROYAL AIR FORCE GAZETTE

London Gazette, February 11, 1936.

General Duties Branch

The following are granted temporary commissions as Flying Officers on attachment to the Royal Air Force:—Lt., R.N.—A. G. Leatham. Sub-Lts., R.N.—C. R. Bateman, N. T. O'Neil, R. P. Thurstan. Lt., R.M.—F. D. G. Bird (January 19). Lt., R.N.—P. W. Compton. Sub-Lt., R.N.—A. S. Whitworth (January 26). Sub-Lt., R.N.—R. A. W. Dobbs (January 27). Sub-Lt., R.N.—K. W. Ross (February 3).

The following are granted short service commissions as Acting Pilot Officers on probation with effect from the dates stated and with seniority of January 20:—J. E. Baskerville, A. Beck, A. A. N. Breckon, R. S. Cannell, D. R. Chance, J. B. Flowerdew, R. E. Lovett, R. J. Oxley, C. A. Richardson, J. A. Roncoroni, J. B. Stewart, C. D. Tomalin (January 27); H. Y. Lawrence, J. F. H. Weston (January 31).

The following Acting Pilot Officers on probation are confirmed in rank and graded as Pilot Officers (January 16):—H. L. I. Brown, G. J. Bush, H. D. Cooke, D. Davies, R. T. F. Gates, J. E. Jacobs, J. C. McG. Lunn, R. E. X. Mack, R. B. Nuthall, V. A. Pope, W. Townson, R. C. Waddell.

The following Acting Pilot Officers on probation are graded as Pilot Officers on probation:—R. W. Hase, R. W. G. Kitley (November 25, 1935); E. C. Eaton, F. C. Hopcroft (December 13, 1935).

The following Flying Officers are promoted to the rank of Flight Lieutenant on the dates stated:—J. Whitehead, G. D. Stephenson (January 26); R. G. Harman (January 27).

F/O. D. G. Lewis is placed on the half-pay list, Scale B (February 6); Sqn. Ldr. G. C. Rhodes is placed on the retired list (February 9).

Stores Branch

The following Pilot Officers on probation are confirmed in rank and promoted to the rank of Flying Officer (January 4):—L. C. Dennis, H. M. C. Harwood.

The following Flying Officers are promoted to the rank of Flight Lieutenant (January 10):—V. H. B. Roth, R. C. Storrar.

ROYAL AIR FORCE RESERVE

Reserve of Air Force Officers

General Duties Branch

The following Pilot Officers are promoted to the rank of Flying Officer:—R. T. Needham (November 15, 1935); L. G. O. Hutchison, H. P. McClean (November 29, 1935); R. Bennett (December 6, 1935); J. N. Addinsell, Fitz-E. J. Evered, G. R. Mack (December 8, 1935); J. J. G. Simper, B. Walker (December 9, 1935); F. H. Vivian (January 1).

Flt. Lt. A. M. Dickeson Howes is transferred from Class A to Class C (May 8, 1935); F/O. N. J. Nock is transferred from Class C to Class A (January 25).

The following Flying Officers relinquish their commissions on appointment to commissions in the Royal New Zealand Air Force:—C. C. C. Manson (March 14, 1935); R. J. Cohen (June 29, 1935); A. G. Lester (July 5, 1935); C. E. Kay (July 8, 1935).

F/O. G. R. White relinquishes his commission on appointment to a commission in the New Zealand Air Force (March 10, 1935).

SPECIAL RESERVE

General Duties Branch

The following Pilot Officers are promoted to the rank of Flying Officer:—W. B. A. J. Keppel (October 28, 1935); J. F. Spanton (January 23).

AUXILIARY AIR FORCE

Accountant Branch

No. 608 (NORTH RIDING) (BOMBER) SQUADRON.—F/O. W. U. Hodson, M.C., relinquishes his commission on completion of service (December 23, 1935).

AUXILIARY AIR FORCE RESERVE OF OFFICERS

Accountant Branch

W. U. Hodson, M.C., is granted a commission as Flying Officer in Class C (December 23, 1935).

ROYAL AIR FORCE INTELLIGENCE

Appointments.—The following appointments in the Royal Air Force are notified:—

General Duties Branch

Squadron Leaders.—V. E. Groom, D.F.C., to No. 58 (B) Squadron, Upper Heyford; to command, 1.2.36. C. H. Cahill, A.F.C., to Headquarters, R.A.F., Iraq, Hinaidi; for Air Staff, Training duties vice Sqn. Ldr. A. L. Paxton, D.F.C., 4.2.36.

Flight Lieutenants.—C. H. Appleton, to Cambridge University Air Squadron, 3.2.36. F. W. H. Hall, to School of Army Co-operation, Old Sarum, 27.1.36. G. E. Nicholetts, A.F.C., to Headquarters, R.A.F., Iraq, Hinaidi, 28.1.36. F. A. J. Pollock-Gore, to No. 3 (Indian) Wing Headquarters, 28.1.36. H. G. Wisher, to No. 812 (F.T.B.) Squadron, 1.2.36. A. H. Seymour-Lucas, to No. 1 (Indian Wing) Station, Kohat, 4.2.36. J. R. Jones, to No. 54 (F) Squadron, Hornchurch, 5.2.36. G. H. Mills, to D.O.I., Dept. of C.A.S., Air Ministry, 14.1.36. J. R. Wolley, to No. 23 Group Headquarters, Grantham, 7.2.36.

Pilot Officer.—K. N. Lees, to No. 5 (Army Co-operation) Squadron, Chaklala, India, 28.1.36.

Acting Pilot Officers.—The undermentioned are posted to the R.A.F. Depot, Uxbridge, on appointment to short service commissions as Acting Pilot Officers on probation, with effect from 20.1.36:—F. Aikens, A. Aitken, L. Aitken, D. J. Bassett, P. R. Beare, H. R. P. Bridgen, G. R. Buchanan, D. C. H. Copping, M. F. C. Farrar, A. S. Forbes, J. H. Grant, I. D. Grant-Crawford, D. H. Holmes, A. N. Jones, K. V. Keen, G. H. E. Kingcome, C. J. F. Kydd, R. H. Lonsdale, A. R. Putt, G. L. Raphael, F. C. Rivers, J. G. Sanders, A. L. H. Solano, C. R. D. Steward, R. N. Stidolph, W. N. Sykes, T. E. Syms, R. B. Townshend, F. E. Williams.

The undermentioned are posted to the R.A.F. Depot, Uxbridge, on appointment to short service commissions as Acting Pilot Officers, on probation with effect from the dates indicated:—*January* 23, 1936: R. A. Allen, S. M. Bird, R. Clarke, A. A. Dilnot, F. R. C. Fowle, J. R. Leatherdale, E. A. Liversidge, G. O. Mills, E. P. Mortimer, R. H. H. L. Oliphant, D. L. Rayment, D. R. Stanley-Adams, F. C. Stibbard, K. T. Thompson, R. H. Warcup, R. A. Weeks, and M. C. Wells. *January* 27, 1936: J. E. Baskerville, A. Beck, A. A. N. Breckon, R. S. Cannell, D. R. Chance, J. B. Flowerdew, R. E. Lovett, R. J. Oxley, C. A. Richardson, J. A. Roncoroni, J. B. Stewart and C. D. Tomalin. *January* 31, 1936: H. Y. Lawrence and J. F. H. Weston.

The undermentioned are posted to No. 10 Flying Training School, Tern Hill, February 1, 1936:—F. Aikens, A. Aitken, D. J. Bassett, P. R. Bearne, H. R. P. Bridgen, G. R. Buchanan, D. C. H. Copping, M. F. C. Farrar, A. S. Forbes, J. H. Grant, I. D. Grant-Crawford, D. H. Holmes, A. N. Jones, K. V. Keen, G. H. E. Kingcome, C. J. F. Kydd, R. H. Lonsdale, A. R. Putt, G. L. Raphael, F. C. Rivers, J. G. Sanders, A. L. H. Solano, C. R. D. Steward, R. N. Stidolph, W. N. Sykes, T. E. Syms, R. B. Townshend, and F. E. Williams, also J. A. Roncoroni, with effect from 10.2.36. E. F. Pippet, to No. 4 (Army Co-operation) Squadron, South Farnborough, 5.2.36. V. E. R. Williams, to No. 15 (B) Squadron, Abingdon, 5.2.36. L. Aitken, to No. 10 Flying Training School, Tern Hill, 5.2.36.

The undermentioned are posted to No. 8 Flying Training School, Montrose, with effect from 8.2.36:—R. S. Allen, J. E. Baskerville, A. Beck, S. M. Bird, A. A. N. Breckon, R. S. Cannell, D. R. Chance, R. Clarke, A. A. Dilnot, J. B. Flowerdew, F. R. C. Fowle, H. Y. Lawrence, J. R. Leatherdale, E. A. Liversidge, R. E. Lovett, G. O. Mills, E. P. Mortimer, R. H. H. L. Oliphant, R. J. Oxley, D. L. Rayment, C. A. Richardson, D. R. Stanley-Adams, J. B. Stewart, F. C. Stibbard, K. T. Thompson, C. D. Tomalin, R. H. Warcup, R. A. Weeks, M. C. Wells, and J. F. H. Weston.

Stores Branch

Flying Officer.—G. I. Rees, to Aircraft Depot, Hinaidi, Iraq, 28.1.36.

Accountant Branch

Flight Lieutenant.—R. G. Dyer, to Aircraft Depot, Hinaidi, Iraq, 28.1.36.

Medical Branch

Flight Lieutenant.—F. E. Lipscomb, to R.A.F. Station, Northolt, 5.2.36.

A TROJAN WARRIOR and his DAGGER

Another view of the prototype Hawker Hector army co-operation machine with the Napier-Halford Dagger III moderately supercharged 24-cylinder air-cooled engine, which is rated at 725 h.p. and gives a maximum of 805 h.p. at 4,000 r.p.m., and 5,000 feet. It achieves something like 200 m.p.h. The top wing has no sweepback (the installation of the Dagger moved the C.G. forward) and a cut-away gunner's position is incorporated. (*Flight* photograph.)

HERE and THERE

B.B.C. Reviews Aeronautical History : R.Ae.C. Meeting : A Rumour Scotched : New Business Development : Empire Air Day

OUT AND UP : This *Flight* photograph, taken at Reading Aerodrome, shows Wing Comdr. F. W. Stent flying the Miles Hawk Trainer in its latest form. In the foreground are the Phillips and Powis experimental shops and in the distance are the New Reserve school and the service hangars.

Twenty-Five Years in Forty-Five Minutes

THOUGH a technically sound piece of broadcasting, the B.B.C.'s "Conquest of the Air" feature last Tuesday evening must have just missed the mark so far as the general public was concerned. There was a first-rate opening in which the pilot of the D.L.H. night mail, about to take off at 10 p.m., spoke from the Croydon tarmac. The rest was a series of word-pictures by various well-known aviation personalities. These were well delivered, but each was too short to give a radio audience time to warm up to the speaker, who in any case could do little more than skim over his subject.

Sir Alliott Verdon-Roe told us of his early trials and the scepticism of the Government; Mr. G. A. Broomfield described how he assisted Col. Cody at Laffan's Plain to build his biplane out of the wreckage of the *Nulli Secundus* airship—how 1½ tons was lifted off the ground by 25 h.p.; Capt. de Havilland recalled how he built his first machine twenty-five years ago, assisted by his wife; Mr. Claude Grahame-White described the 1909 Rheims meeting and the London-Manchester contest; Capt. Duncan Davis recollected how, as a boy, he had helped in the preparation of the Cody biplane which won the Military Trials of 1912; Capt. A. E. Illingworth and Oberleutenant Richard Berg, who had respectively fought against and with Von Richthofen, paid tributes to the Red Knight; Mr. James Jeffs talked of air navigation; Capt. Youell showed us commercial aviation, 1919-1936, through a pilot's eyes; a ground engineer's job was described by an anonymous member of the clan; Col. Fitzmaurice talked of Atlantic flights, Air Comdre Robertson, O/C. at Croydon, explained airport traffic control; and a few words from Flt. Lt. Rose in Cape Town (a recording from his broadcast on the previous Sunday night?) brought us to the *finale*—the German night mail pilot, who was by now across the Channel, talking to Croydon in W/T.

All this, linked up by a somewhat breathless recital of dates, events and records, and interspersed with the deafening incidental music so beloved of B.B.C. producers, was crammed into forty-five minutes; which, perhaps, explains why it was unsatisfying.

Royal Aero Club A.G.M.

ANNUAL General Meeting.—The annual general meeting will be held at the Club Premises, 119, Piccadilly, London, W.1, on Wednesday, March 25.

Notices of motion must be received by the secretary not less than 21 days before the meeting and must be signed by at least five members.

The attention of members is particularly drawn to the following rules governing the election of the committee.

Committee Election: In accordance with the rules, the Club shall be governed by a committee of eighteen members. Members shall be elected to serve for two years, half the committee

Here and There—

retiring annually. Retiring members are eligible for re-election.

Retiring Members: The retiring members of the committee are: Major C. J. W. Darwin, D.S.O.; W. Lindsay Everard, M.P.; Major A. Goodfellow; A. C. S. Irwin; Major R. H. Mayo, O.B.E.; Lieut.-Col. J. T. C. Moore-Brabazon, M.C., M.P.; Lieut.-Col. M. O'Gorman, C.B.; Major H. A. Petre, D.S.O. The late Mr. John Lord would have been a retiring member.

Nomination of Candidates: Nomination of candidates for election to the committee must be received by the secretary not less than 14 days before the Annual General Meeting, with an intimation in writing that the members nominated are willing to serve. Nominations of candidates shall be signed by at least two members proposing them. H. E. PERRIN,
Secretary.

Unfounded

A REPORT was circulated last week to the effect that the Austin Motor Co., Ltd., of Northfield, Birmingham, was to embark upon the production of aero engines. Another report alleged that the company was to produce a light aeroplane to sell at £300. On questioning a director of the Company as to the authenticity of these statements we were assured that they were incorrect, and that no such decision had been reached.

Saro Managing Director: Sqn. Ldr. Darwin

IT is announced that the post of managing director of Saunders-Roe, Ltd., left vacant by the death of Mr. John Lord, has been accepted by Sqn. Ldr. C. J. W. Darwin.

He joins these well-known constructors of flying boats at a time when they have a big production programme on hand, particularly for the Saro London.

Sqn. Ldr. Darwin, transferred from the Coldstream Guards, learned to fly in 1916, and served with the R.F.C. in France. After the war he was posted to Cranwell, then to Uxbridge, and, finally, to the Air Ministry. On retiring from the Service in 1928 he joined the Bristol company, and he has now resigned his position there in order to take up his new post.

Aero Engines Ltd., Capital Increase

AT an extraordinary general meeting of Aero Engines, Ltd., held at Bristol last Friday, resolutions were unanimously adopted increasing the capital to £400,000.

The chairman, Sir Maurice Bonham-Carter, K.C.B., K.C.V.O., said that the board attached a high value to their agreement with the Hispano Suiza Company, for it enabled them to select for production an engine which had already been commercially proved and perfected.

Apart from a big renewal of business on their motor cycle manufacturing side, very substantial orders had been received for aeroplane wings and components, as well as for light aero engines and industrial trucks. Their request for additional resources was made in anticipation of future needs, as the company still possessed in cash more than a third of its original working capital.

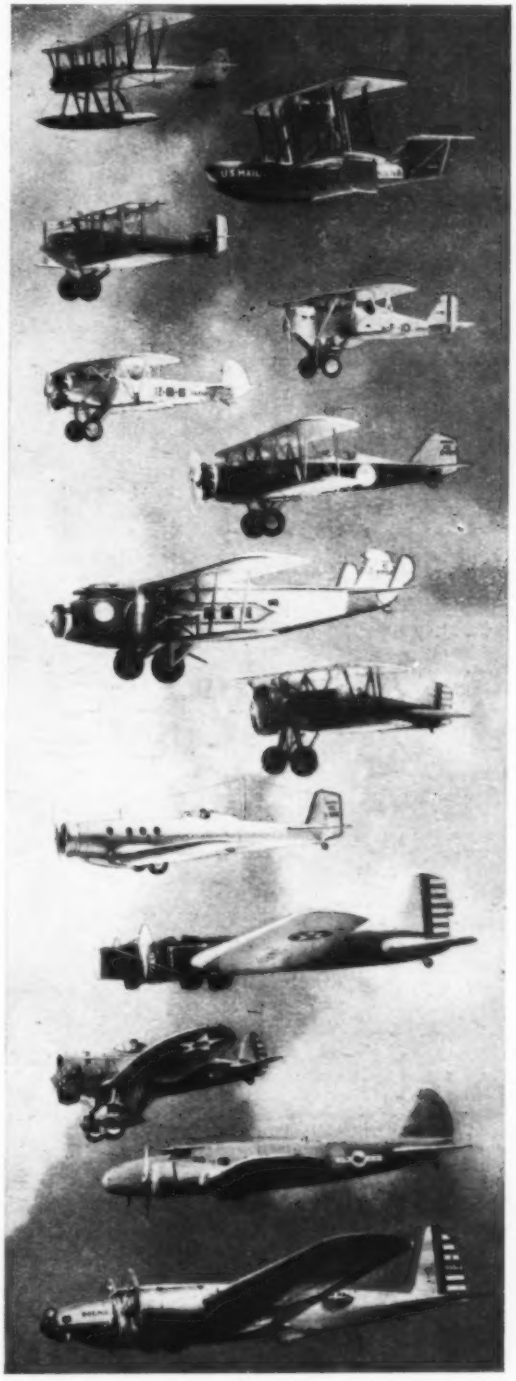
Empire Air Day, 1936

THE Air League of the British Empire announces that Empire Air Day is to be held on Saturday, May 23. The Air Ministry has agreed to the participation of the Royal Air Force, and, as was the case last year, the majority of flying clubs will also assist.

Empire Air Day was inaugurated by the Air League in 1934 to provide an opportunity for the public to get into closer touch with aviation, and His Late Majesty King George V gave a lead to his people by visiting the R.A.F. station at Bircham Newton. The immense success of last year's Day, when tens of thousands of people attended aerodromes all over the country, will still be fresh in everybody's memory. In these two years Empire Air Day has brought more than £7,000 to aviation charities.

Again this year Empire Air Day will be celebrated in the Dominions overseas; India is celebrating the Day this month, before the hot weather starts.

Presumably the large number of squadron moves which have taken place during the year will complicate the organisation, but the Air League and the Royal Air Force can safely be relied upon to put up a really good show, and it will be surprising if public attendances are not even larger than they were last year.



BOEING EVOLUTION. This most interesting composite picture prepared by the Boeing Company shows progress made since 1916. Reading from the top, the views show the first Boeing product, built in that year; the B-1 flying boat (1919); MB-3A U.S. Army pursuit (1920-21); FB-5 Navy carrier fighter (1926-27); F3B-1 Navy carrier fighter (1927-28); 40B-4 (1929); 80-A (1929-30); P-12C pursuit (1930-31); Monomail (1931-32); Y1B-9A (1931-32); P-26A pursuit (1933-35); 247D (1935) and the 299 (1935).

Here and There—

Model Aeronautical Prizes

THE annual prize distribution of the Society of Model Aeronautical Engineers takes place on March 5, at 7.30 p.m. in the Oak Room, Y.M.C.A. Headquarters, Tottenham Court Road, London.

I.B.E. Moves

OWING to increased membership and volume of work, the Institute of British Executives has moved into larger offices at Swan House, 79, High Holborn, London, W.C.1.

The Super Drone in the Midlands

PLANS for the distribution of the B.A.C. Super Drone are going ahead. Mr. Derick Burcher, of T.B.C., Ltd., Kidderminster, and Mr. W. T. Thorne, of Thornes (Worcester), Ltd., have obtained, jointly, the distributing rights of this interesting ultra-light aeroplane over seven Midland counties.

The Leipzig Fair

THE 1936 Leipzig Fair begins on March 1. The most important section is the engineering exhibition, and this continues until March 9. Full particulars regarding reduced travel rates, etc., are obtainable from the London Office of the Leipzig Fair, First Avenue House, High Holborn, London, W.C.1.

Faireys at Stockport

AN interesting company formation recently announced is that of the Stockport Aviation Co., Ltd., registered as a private concern with a nominal capital of £10,000 in £1 shares.

The company has been formed to operate the new factory purchased by the Fairey Aviation Company at Heaton Chapel, Stockport. At the recent annual general meeting of the Company it was stated that this factory, over twice the size of the Hayes works, was already in operation. Some 750 people were now employed there, and this number would be greatly increased in the near future.

The Richthofen Riddle

IN the spring number of the *Journal of the Royal Air Force College*, Wing Commander G. E. Livock, D.F.C., A.F.C., writes on the disputed question of who shot down Baron von Richthofen. The Wing Commander is now C.O. of No. 209 (F.B.) Squadron, and it was to that squadron that Capt. Roy Brown and Lieuts. Mellersh and May belonged in 1918 when the German baron was killed. The squadron claims that he fell to the fire of Capt. Brown.

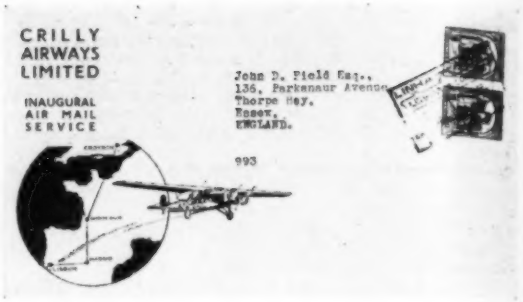
It is strange to think that this squadron, which originally belonged to the R.N.A.S., was flying Camels in 1918 and now, in 1936, is equipped with Perth flying boats.

Air Mail Commentary

AIR transport is growing up. D.L.H. (writes Alec Davis) will complete its tenth year of operation in April, and the German post office has celebrated the anniversary in anticipation by issuing a 40-pfennig commemorative stamp with the inscription "10 jahre Lufthansa 1926-1936."

Designed by Karl Diebitsch and printed in photogravure, this stamp shows a Heinkel He.70 of the type used on the European section of the D.L.H. service across the South Atlantic. It is the first stamp I have seen showing an aeroplane with retractable undercarriage, and is illustrated here by courtesy of Whitfield King and Company.

The Austrian and German stamps referred to above.



A cover carried on the first Crilly Airways Lisbon flight.

D.L.H. was formed—like Imperial Airways two years before—as a national combine of several smaller air lines. Junkers monoplanes were the backbone of the fleet in 1926, as they have been ever since, and it seems a pity that no machine of this make has been honoured by a German stamp.

But the choice of Heinkel has at least the merit of originality, whereas Junkers vie with De Havillands for popularity among stamp designers. They have been illustrated on issues from New Guinea and Estonia, Persia and Austria—and used on air lines in all these countries. The Austrian issue appeared only a few months ago, and shows the Austroflug (Austrian national airways) three-engined Junkers G.31 flying over a picturesque river valley.

* * *

Senegal, the colony that provides the jumping-off place for France's South Atlantic service, has just issued her first stamps for air mail—a set of eleven, some showing a twin-engined monoplane and others a biplane dating from about 1918.

Other new issues come from Haiti, Guatemala, Nicaragua and Paraguay, while more are promised from Cuba and Ecuador. Some South and Central American countries show more activity in issuing air stamps than in opening air routes. Perhaps they find it more profitable.

An ingenious but frustrated attempt to make money out of stamps is reported from Uruguay. The Chamber passed a bill for the supply of aeroplanes and other equipment for the army (by un-named suppliers) in exchange for an issue of stamps, the sale of which would have been illegal in Uruguay, their country of origin.

The stamps could have had no postal value, and therefore no real value to collectors. Leading dealers throughout the world threatened that they would neither handle nor catalogue such an issue. So the Uruguyan Government has been forced by adverse opinion to drop the project—and I hope it will pay cash for its aeroplanes.

* * *

Crilly Airways, Ltd., has joined the select few who carry mails under contract. Their Lisbon-Madrid-Bordeaux-Croydon service was opened on February 4 (as reported in *Flight* of February 6) when the Fokker F.12 monoplane *Lisboa* brought a load of mail from Portugal. Covers flown bear no special stamp or label, but a postmark that includes a rough outline of an aeroplane. Some are of a special type inscribed with the name of the company, the words "Inaugural Air Mail Service," a map of the route, and a picture of the *Lisboa*; one of these is illustrated on this page.

At present no mail is being carried from Croydon, as Crilly Airways have not obtained a British Government contract.

* * *

One airway extension is reported from a part of the world that is in the news. Some time ago, when permission was granted for Imperial Airways machines to land in Italy, the Ala Littoria was in return given facilities in British colonies. Now it has taken advantage of this to extend its Khartoum-Eritrea service into British Somaliland.

The first flight, arranged for December 14, had to be postponed till December 16. Only a few hours' notice was given at the Khartoum post office, and consequently the mail carried was extremely light. Mr. Francis J. Field reports that not more than ten covers are known, and of these one at least was returned to its sender as the addressee could not be traced. It bears a Sudan air stamp and label, and is postmarked "Sudan Air Mail—Khartoum—15 XII 35."

AERONAUTICAL INTEREST at the B.I.F.

A Monospar to Encourage the Business Man to Fly : Many Component Manufacturers Represented

At the engineering section of the British Industries Fair at Castle Bromwich, Birmingham, there is a display of almost staggering variety. From bird cages to boilers, and from vacuum cleaners to aeroplanes, the exhibits are staged in wonderful profusion.

However, a careful survey reveals the fact that more and more engineering firms are realising that the aircraft industry is one which is worthy of the closest attention. Actually, aircraft have been exhibited at the Birmingham section of the Fair on past occasions, but, this year, there is concrete evidence of the progress of the industry.

One of the chief items of interest is the General Aircraft exhibit of a beautifully finished and equipped Jubilee Monospar. This machine, which is attracting great interest, seems almost out of place in the midst of so much that is immobile, or whose element is the ground. The makers are very sensibly adopting a "flying business man" appeal angle.

Components

In the engineering section there are few who have not something that is of interest to those who are engaged in the manufacture of aeroplanes, and on many stands one finds examples of components and materials specifically designed for aeroplane work.

Such people as Reynolds make a point of emphasising their activities in the production of aeroplane parts, and this firm has on view a large-scale model of a Short Scion Senior built up very largely of parts made from alloys such as R.R.56. To this end, wing sections are shown cut away to show the construction of the ribs and spars.

There are several firms which specialise in factory and airport equipment.

Aerodrome lighting equipment figures in the displays of B.T.H. and G.E.C. The former are, apparently, more interested in the manufacture of high-power lamps for use in such equipment, while the latter have a tiny model of a 9 kW. nine-lamp floodlight of a type that is being used on a large scale.

Then, the Cardiff Foundry Co., Ltd., has an example of its aerodrome boundary beacons which collapse to the ground should they be fouled by an alighting machine. Many well-known lighting items are, of course, in the G.E.C. list, though they are not actually shown. Chance Bros., also, are too well known to need introduction and are amongst the most famous of firms where lighting is concerned.

An interesting note is struck by the exhibition on the Lucas stand of a Pobjoy engine fitted with a Rotax aero generator electric engine starter. There are also, on this stand, examples of nine- and twelve-cylinder Rotax-Watford aero magnetos arranged for high and low speed demonstration.

To owners of factories, repair shops and aerodromes, the productions of Constructors, Ltd., Birmingham, are of special interest. They include metal bins for small parts, steel benches and portable benches, and tool racks, the latter being particularly interesting. They also have on view a special steel cabinet for the efficient filing of drawings, blue prints and maps, capable of taking both large and small sheets, and rendering each and every one immediately accessible.

What is being done in aeroplane factories from the point of view of the heat treatment of metals is demonstrated by the Incandescent Heat Co., Ltd., Smethwick. A comparatively small furnace is on view, but this firm is supplying an ever increasing number of large heat treatment appliances to several of the bigger engine and aircraft makers.

Variety

Terry's show valve springs in remarkable variety and form. For overhaul and repair work on machines the Angle-poise lamp, marketed by this firm, is of more than passing interest; it may be directed on to any point and it stays put without it being necessary to undo or tighten any clamps.

Desoutter Bros., Ltd., are displaying their light and compact portable power tools which are now proving so popular in the aircraft industry.

It would be impossible to deal with all the firms exhibiting constructional material, but among the steel-makers whose products are well known in the aircraft industry are Firth-Vickers Stainless Steels, Ltd., and Thomas Firth and John Brown Ltd.

AN AIRCRAFT MANUFACTURER'S ADVICE

SPEAKING at the dinner of the Institute of British Carriage and Automobile Manufacturers, held in London last week, Mr. F. Handley Page said that he would like to issue a serious word of warning in regard to buying aircraft shares, because a lot of people were going to lose a great deal of money. Money should never be made when there were boom conditions, such as existed at the present time, which arose from a national emergency. Yet money was made by people who were proprietors of or shareholders in aircraft companies or companies dealing with national armaments. He could say that nobody who was in the aircraft industry wished to make an undue profit out of the crisis in which we found ourselves to-day, and everybody dealing with equipment and material was animated, he was sure, by the main desire that this country should attain the place it ought to hold in the air, and in attaining that place they would not at the same time have their hands in the pockets of the general public. But, unfortunately, when these booms arose one did find speculation by a lot of people; they had people rushing in to skim off the cream and get all they could out of it. He considered that all aircraft shares, without exception, all aircraft engine shares, aircraft machine shares, aircraft equipment shares, were priced very much too high. "If you want to lose your money," said Mr. Handley Page, "go and buy them. I could tell you the best of the lot, but modesty prevents me." (Laughter.)

The speech was not recorded in the daily Press, and next day there was another fairly general advance in the share prices of aircraft and aero engine manufacturers.

Forthcoming Events

Feb. 20. R.Ae.S. (Coventry Section) Lecture: "Variable-pitch Airscrews," by Mr. T. E. Beacham, 8 p.m., Armstrong Siddeley Canteen.
Feb. 21. Croydon Airport Staff Dinner and Ball, Greyhound Theatre, Croydon, 7.45 p.m.
Feb. 21. D. H. Aeronautical Technical School: Annual Dance, Hyde Park Hotel, London, 9 p.m.
Feb. 25. R.Ae.S. Students' Section Lecture: "Mechanical Testing of Structures and Components," by W. Tye, 7 p.m., R.Ae.S. Library, 7, Albemarle Street, London, W.1.
Feb. 29. Bristol and Wessex Aeroplane Club: Annual Ball.
Mar. 5. R.Ae.S. Students' Section Lecture: "Airflow Experiments," by W. S. Coleman, 7 p.m., R.Ae.S. Library.
Mar. 6. Leicestershire Aero Club: Dinner and Ball, Grand Hotel, Leicester.
Mar. 10. Royal United Service Institution Lecture: "The Development of Civil Aviation," by Lt. Col. F. C. Shelmerdine, at 3 p.m.
Mar. 19. R.Ae.S. (Coventry Section) Lecture: "Type-Testing an Aircraft" by Flt. Lt. Bulman, 8 p.m., Armstrong Siddeley Canteen.
Mar. 20-22. Re-union of Halton Belgium Tour parties, High Leigh, Hoddesdon, Herts.
Mar. 23. R.Ae.S. Lecture: "Welding," by R. H. Dobson. Institution of Electrical Engineers, 6.30 p.m.
Mar. 26-29. Yorkshire Gliding Club: Members' Meeting.
April 16. R.Ae.S. (Coventry Section) Lecture: "Aircraft Instruments," by Mr. J. E. Chorlton, 8 p.m., Armstrong Siddeley Canteen.
April 20. "New Light on Strength of Materials Afforded by Modern Physics," by Dr. H. J. Gough. Institution of Electrical Engineers, 6.30 p.m.
May 15-18. Yorkshire Gliding Club: Open Meeting and Competitions.
May 15-June 1. Stockholm Aero Show.
June 6. R.A.F. Flying Club: Annual Display.
June 20. Brooklands Flying Club: "At Home."
June 27. Royal Air Force Display, Hendon.
July 10 and 11. King's Cup Race.
August 1-2. Yorkshire Gliding Club: Open Meeting.
August 15-30 Yorkshire Gliding Club: Open Meeting and Competitions.
Nov. 13-29. Fifteenth International Aero Exhibition, Paris.

COMMERCIAL AVIATION

— AIRLINES — AIRPORTS —

FOR IMPERIAL SERVICE: The first of the new D.H. 86 A's which are being built for Imperial Airways. These machines are not fitted with v.p. airscrews. (*Flight* photograph.)

THE WEEK AT CROYDON

Weather and Fuel Reserve : Returning Hospitality : Mosquito Hunting : Rapid Refuelling : De-icers

ON Saturday morning even the interest aroused by the matter of Scandinavian subsidies was forgotten when a dense fog descended suddenly on Croydon, and generally disorganised air traffic. One of the Sunday newspapers made much of the fact—a perfectly true one—that a K.L.M. machine had flown over Croydon, found that none of the so-called emergency airports in this country were available, and therefore flew back to Rotterdam. In other words, the pilot was able to fly Rotterdam-London return non-stop. The newspaper spoke of "dwindling petrol supplies."

Naturally they would dwindle, but the point of the whole thing was missed. If a machine can return to its previous port of departure with any fuel at all, it shows that real precautions are taken, and proves that the big air transport companies are prepared to sacrifice revenue in the interests of safety. I wonder if it is generally realised how much petrol weighs?

On Sunday the same annoying fog descended at about midday just as the various services were due in at Croydon, together with a number of extra machines setting right the previous day's disorganisation. At one time there were no fewer than fifteen machines in the air, which, thanks to the assistance of the Croydon control, were able to get down at various aerodromes such as Biggin Hill, Kenley, and Lympne. Biggin Hill and Kenley must not be used except in an emergency, but I know several foreign pilots who, when that emergency arises, are by no means sorry—such is the courtesy, hospitality, and friendliness with which they are received by the R.A.F. people there.

This is pleasant hearing, because we at Croydon treat the foreign pilots as business visitors and make no fuss of them. On the other hand, British pilots visiting many ports in Holland, Germany, and Scandinavia are given a welcome which is out of all proportion to that which we in this country think due to anyone just doing an ordinary job of work.

Romance has not died with the advent of the aeroplane. Only the nature of the quest has changed. Men used to set out in a caravel for Cathay in order to hunt unicorns and basilisks or to pluck the screaming mandrake in Samarkand. On Sunday Messrs. H. S. Leeson and J. D. Gillett left by Imperial Empire service for Uganda, whence they will travel by lorry through Southern Rhodesia and the Sudan. Their purpose is to hunt a far more deadly monster than the cocatrice or basilisk, to wit, the malaria mosquito, which renders vast stretches of fertile country almost uninhabitable for white people. They were travelling on behalf of the London School of Hygiene and Tropical Medicine.

I hear that some of the companies are to schedule quick turn-round services for Croydon next summer, the idea being that a modern machine must earn its keep and fly about eight hours a day in the busy season. It is a matter for snappy organisation when a machine is only to be on the ground for about twenty minutes. We hear wonderful things about American refuelling, and imagine "ships" taxying violently and tail-up into hangars, the pilots clapping on the brakes exactly beneath overhead tanks. Pipe lines descend vomiting "gas," and attendants flash with smouldering overalls down ropes according to a split-second schedule. There is probably much fuss and shouting and a general lack of repose.

We don't bother much, and never taxy around tail-up. The ordinary mobile refuelling unit is on the tarmac and at work within a few seconds. Its capacity is 30 to 40 gallons a minute. Incidentally, there are far too few of these travelling tankers about, and those petrol companies who do not produce more of them before the spring rush may lose business to those who do. Next summer there is going to be a whole lot more traffic.

The Vickers Viastra, which is understood to be on loan from Air Ministry to Imperial Airways, is now being fitted with the Dunlop Anticer at Croydon. This, of course, is a monoplane, and there are those who demand different treatment for the biplane, on which, they say, the leading edge deposit is not serious, whereas on struts and around the acorn at the juncture of bracing wires it creates serious difficulties. The Viastra is to be used, I am told, on the proposed Imperial night mail service to Germany.

A correspondent, who lives on the English coast, recently sent me an amazing record of K.L.M. machines which he had seen passing over during the course of years. It was so complete that it went away back to the very early days when the official Dutch registration was H — instead of PH —. Having seen several Fokker F.12s for the first time with English registrations, he rightly supposed that they belonged to the Crilly fleet. For his information the four Fokkers now registered as G-ADZJ, G-ADZK, G-ADZI and G-ADZH used to be respectively PH-AIE, PH-AII, PH-AFU and PH-AFV. The first three have already made their appearance at Croydon, and the fourth is expected any day now.

Croydon is bidding good-bye, with considerable regret, to Detective-Sergt. Potter, of the Special Branch, Scotland Yard, who has been at Croydon for nearly three years. Unobtrusively he has kept an eye on such undesirables as might seek to enter or leave *via* the Airport of London, a task for which he was well fitted by his counter-espionage work during the War, when he was much on the Continent and was connected with "Q" boat work and the interception of suspicious foreign vessels. Detective-Sergt. Potter is retiring after twenty-five years' service in the Force.

A. VIATOR.

Swissairs' Year

A CONSIDERABLE increase of both traffic and mileage figures has been reported for last year by Swissair—an increase which represents an improvement of 83 per cent. in passenger-kilometres between 1935 and 1934.

First Across

IT appears that after all the fuss Germany may be the first to operate a regular service across the North Atlantic. An agreement has been reached at Washington, and it has been reported that a boat has already arrived at the Azores to study local conditions. Needless to say, the route will be *via* the Azores and Burmuda, and in the agreement, Germany is given the right to make flights to the U.S. with the L.Z.129.

Deruluft in 1935

CONNECTIONS were organised by Deruluft last year between Moscow or Leningrad and Paris, London, Amsterdam and Stockholm. This year connections will also be made between Moscow and Brussels.

The operations of Deruluft increased considerably during 1935, its machines (Ju 52's and A.N.T.9's) having covered 939,000 miles, and carried 1,511 passengers and 89.3 tons of freight.

Swissair Combats Ice

FOR the winter service Swissair's Douglas machines have been fitted with metal spinners which are covered with oil-impregnated leather to protect the v.p. mechanism of the Hamilton airscrews. A surplus of grease is pumped into this mechanism and the spinners help to retain the heat, so that the grease is carried centrifugally down the leading edges of the blades. The machines also have oil-impregnated leather coverings for the tail-plane leading edges, and the pitot heads are, of course, electrically heated.

The Atlantic's Toll

HOPE was abandoned at the end of last week that the Laécoère boat, *Ville de Buenos Aires*, might eventually be found. The machine had been missing since Monday afternoon of last week, with a crew of four. The crew of a Bleriot flying boat, *Santos Dumont*, have searched fruitlessly in the area of Ile St. Paul.

At the time of going to press nothing had been heard of the D.L.H. Dornier Wal, which disappeared on Sunday on its way from Natal to Bathurst. It is still possible that the boat had put down at some uninhabited part of the African coast, though no radio messages, either on short or long wave, have been received. This Wal had only just been delivered.

A Corner in Aerodromes?

LAST week the Ipswich Town Council approved the leasing of the municipal aerodrome to Mr. Whitney Straight for a period of twenty-one years. Mr. Straight is already a director of Ramsgate Airport, Ltd., and has also interested himself in Roborough aerodrome, Plymouth.

A Phoenix for Australia

IN the middle of next month, Mr. H. J. Melrose will be coming to this country to collect his Heston Phœnix which will be used on his "Adelaide to Anywhere" charter service. The machine is almost ready and Mr. Melrose is hoping to be able to obtain a living payload—four passengers—for his delivery trip.

Heston's Lorenz System

A JUNKERS Ju.52 belonging to D.L.H. and piloted by Herr Steinbeck made a successful flight test of the Lorenz installation at Heston on Monday of last week. Among the experts who accompanied him as passengers was Herr Dr. Kramer, who has played a leading part in the development of the system. They reported that the system is functioning to their entire satisfaction. A demonstration will be given towards the end of this week. Airwork has fitted the receiving equipment for the Lorenz system to Standard Telephones and Cables' Puss Moth, which is to be used for demonstration purposes.

Aircraft movements for the month of January (excluding the flying school) totalled 1,619. This shows a 31 per cent. increase on the figures for January, 1935, although the weather has been particularly unfavourable. At first sight, the observer inclines to attribute this increase partly to the fact that British Airways have temporarily transferred their base to Heston owing to the condition of the landing area at Stapleford. Further analysis, however, shows that whereas in January, 1935, movements were 42 per cent. commercial, in 1936 commercial aircraft only constituted 41 per cent. of the total traffic. So there is a steady growth in the use of Heston by private as well as by commercial aircraft and no one company can claim the major part in this universal upward trend.

Mr. R. Falk is leaving Air Commerce and joining Commercial Air Hire as a pilot on the Croydon-Paris "Dawn Express."

On Tuesday of last week Mr. Israel, of Jersey Airways, flying an empty machine to Southampton below the clouds, watched the rain hit his wings and there solidify with alarming rapidity. He gradually lost height, but the light load enabled him to reach Southampton with such flying characteristics as remained to the deformed aerofoils. He landed just as his instruments froze up. This is believed to be the first case of serious ice-formation experienced by Jersey Airways.

Commercial Aviation

Another Indian Aerodrome

BOTH the Kathiawar Flying Club, started about four years ago, and Tata Sons' mail service have helped to make Ahmedabad a flying centre of some importance in India, and it appears now that a new and large aerodrome is to be laid out. The present aerodrome belongs to the military authorities of Ahmedabad Cantonment.

Plans for the aerodrome, which will be on similar lines to that at Baranli, near Allahabad, have already been submitted, and work will presently be started under the guidance of Mr. J. E. S. W. Elkington.

Bristol Changes

AT a meeting of the Bristol City Council held on February 11, it was decided to appoint Capt. L. P. Winters as full-time manager of the Bristol Municipal Airport. Since this was opened in May, 1930, it has been managed on behalf of the Corporation by the Bristol and Wessex Aeroplane Club, and for the past six years Capt. Winters has held the dual appointment of club manager and airport manager.

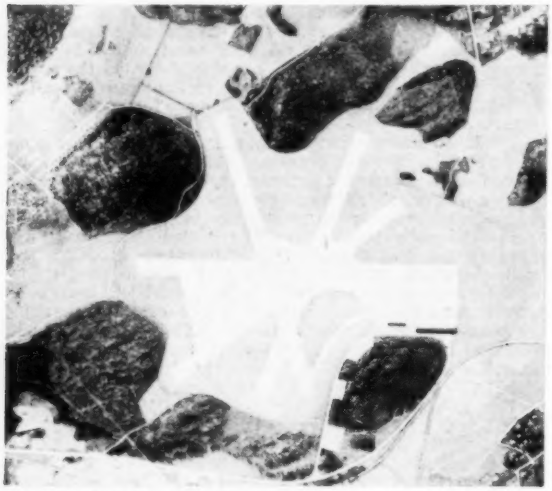
The increasing commercial activity and the changing type of air traffic, coupled with the establishment of radio and meteorological stations at Bristol, now necessitate the services of a full-time manager. The club will, however, continue to co-operate with the municipal authorities.

There will be some reorganisation of the Bristol and Wessex Club staff, which will probably include the appointment of a secretary in place of the retiring club manager. The new agreement takes effect from April 1.

Without Subsidy

CANADA'S airways are carrying more freight and express than those of any other country in the Western Hemisphere. Complete figures for the first six months of 1935 are not yet available, but Canadian Airways flew 2,426,962 lb. of express and freight. All the U.S. domestic and foreign routes, which include those in Central and South America, carried only 2,221,013 lb. during the same period. During 1934 Canadian machines had carried 14,441,179 lb., while all U.S. services carried only 3,449,675 lb.

There are no scheduled passenger services between Canadian cities, but let the traveller go beyond the railways, and he will find them. It is these services, of course, which have set up these record figures. Regions which formerly awaited the annual or bi-annual boat or dog team are now served by aeroplane, and this faster service has proportionately increased their needs. In addition, the aeroplane has thrown open new regions to prospectors, and a mining boom has resulted. For some years Canada has been carrying the greatest freight tonnage in the Western Hemisphere, comparative figures showing that in 1933 Canada carried 4,206,000 lb. against the U.S. figure of 2,500,000 lb.; in 1932 the figures were respectively 3,129,974 lb. and 1,600,821 lb., while in 1931 Canada flew 2,372,467 lb. and the U.S. carried 1,151,348 lb.



STOCKHOLM'S AIRPORT: When it is opened on May 23, Bromma Airport will be one of the most up-to-date in Europe. This photopraph shows the layout of the runaways, which are 800 metres in length, and of the approaches.

Edinburgh's Aerodrome

AT last the city of Edinburgh has made a start with its municipal aerodrome. A supplementary vote of £6,000 has been carried for levelling and other work at Gilmerton, which lies to the south-east of the city on the road to Dalkeith. The site is between four and five miles from the centre.

A Swedish Increase

THE Swedish A.B. Aerotransport Company reports for the past year—its twelfth—an increase of 4,884 in the number of passengers carried when compared with the previous year. Actually, the figures were 22,956 and 18,072 respectively. The quantity of mail carried during the past year also rose by more than 27 per cent. The Aerotransport fleet flew 625,000 miles during 1935, and not a single passenger, it is stated, has been killed or seriously injured during the past twelve years.

South American Replacements

AIR France is carrying out extensive replacements in their equipment on the South American mainland. Two Fokkers (Three Gnome-Rhone K 7s) are now running along the coastal link between Natal and Buenos Aires, and a third is on its way by steamer. Also operating between Buenos Aires and Rio are two Breguet 393s (three Gnome-Rhone K7s), while the single engine Latécoère 28s and Potez 25s, at present used on the lofty trans-Andes link from Buenos Aires to Santiago, are being taken off altogether in favour of the Potez 62-1 (two 690 h.p. Hispanos).

The first of these machines, which are fitted with retractable undercarriages, was flown to Le Havre by Lionel de Marnier (raised to commandership of the Legion of Honour last week) for trans-shipment to Buenos Aires in the *Belle Ile* on February 17. Three of these have been ordered by Air France for the Andes section. They cruise at 155 m.p.h., carry a payload of one ton, and, with a head wind of 50 m.p.h., have a cruising range of 600 miles.

New Zealand News

IT is now learned that the proposed improvements at Rongotai Aerodrome, Wellington, are estimated to cost £128,000—quite a sum for a small community of not much over 100,000 inhabitants. Several councillors have suggested that the sum was altogether too large. Gear and Scabey Islands (at Petone, seven miles north from Wellington) were suggested as alternative sites However, the Airport committee's report was "tentatively" approved.

Cook Strait Airways' fare proposals for the Wellington-Blenheim service met with opposition from the Councils of both towns. To enable the company to make a start before Christmas the Transport Co-ordination Board approved a temporary time-table and schedule of fares. Two daily out-and-home services between Nelson, Wellington and Blenheim are scheduled. Union Airways' time-table provides for a departure from Palmerston North at 8.30 a.m. and an arrival at Blenheim at 9.27 a.m. Passengers so desiring may transfer to the Cook Strait Airways' machine timed to leave Blenheim at 9.40 for Wellington. From the Dunedin terminal a machine will leave at 11.30 a.m. and arrive at Blenheim at 2.30 p.m. South Island passengers for Wellington will transfer there to a Cook Strait Airways machine leaving at 2.40 and arriving at Wellington at 3.10 p.m.

Over £10,000 is to be spent on development of Motueka aerodrome and the work of levelling has already commenced.

The condition of the Gisborne aerodrome has been responsible to a large extent for the loss shown in East Coast Airways' first balance-sheet—nearly £600 had to be spent to make it anything like usable. A further contributory factor was the fact that the company planned to commence operations in November, 1934, but an indication that legislation was to be enacted for the control of commercial aviation companies made it necessary to delay until the proposed conditions were made known. Nearly six months elapsed before a start was possible and in consequence the summer passenger traffic was missed.

In spite of adverse weather conditions during the winter the company's machines flew 97.5 per cent. of the trips scheduled and carried over 2,000 passengers.

Last week Union Airways (N.Z.), Ltd., opened their service between Palmerston North and Dunedin, using D.H.86 machines. Mr. B. A. Blythe, late of Jersey Airways, is the chief pilot of the company. Union Airways is the fourth company to start serious operations in New Zealand, the others being Air Travel, Ltd., Cook's Strait Airways and East Coast Airways. Another concern, Great Pacific Airways, expects to open an Auckland-Dunedin service this year.

A BRITISH RAID on SCANDINAVIA

Two More Companies Now on the London-Malmö Route : British Airways Ltd. to Receive a Government Subsidy

The party which made British Airways, Ltd., survey flight in a D.H.89, photographed at Malmö. The group includes Flt. Lt. W. F. Anderson, chief pilot (third from right), Sqn. Ldr. E. H. D. Spence, R.A.F.O., of the Air Ministry technical department (fourth from right) and Mrs. Spence.

DURING the last week or two developments in the matter of British air services to Scandinavia have followed thick and fast. As reported in *Flight* last week, British Continental Airways made their inaugural flight from Croydon to Malmö on February 7. A few days later—on Wednesday of last week, February 12, to be precise—British Airways, Ltd. made *their* inaugural flight. British Scandinavian Airways, as their title suggests, are interested in Copenhagen as a terminus, though they have not yet started flying, and will in any case use a direct northern route over the North Sea. Two of these three concerns will be operating over a route which is already served over most of its length by four Continental companies, K.L.M., A.B. Aerotransport, D.L.H. and D.D.L. (Danish Airways), and this multiplicity has been the subject of much discussion, which broke out anew last Friday when the important news was announced that the Government has decided to subsidise British Airways, Ltd., over this route—the first subsidy to be made to any British company other than Imperial Airways.

The Subsidy Announcement

No details regarding the subsidy are yet forthcoming. The Air Ministry merely authorised the company to make the following statement:—"The Government has agreed to give financial support to British Airways, Ltd., the company recently formed by the amalgamation of Hillmans, United and Spartan Air Lines in respect of the operation of the new air service between London and Scandinavia, which will be officially opened on February 17."

British Airways' inaugural flight last Wednesday and Thursday was a very informal affair, carried out in a D.H. 89, whereas the actual service, which was due to begin last Monday but was held up by morning fog, is being worked by D.H. 86s, which in turn are to be replaced in a few months time by the speedier new D.H. 86a. Piloted by Flt. Lt. W. F. Anderson, chief pilot to British Airways, and carrying a radio operator, a flight engineer, and four passengers, one of whom was an Air Ministry official and another a member of the staff of *Flight*, the machine left Heston at 10 a.m., proceeded to the Belgian coast and flew northward to Amsterdam, where a call was made; it then flew direct to Copenhagen, where its occupants spent the night, crossing over the narrow arm of sea to Bulltofta Airport, Malmö, the next morning. The return flight was made with stops at Hamburg and Amsterdam, whence the direct crossing of the North Sea to the Thames Estuary was made. The route, with its many alterations of land and sea, is a most interesting one from the passenger's viewpoint, and on this particular occasion the effect was heightened by such spectacles as that of the Zuyder Zee frozen from shore to shore.

Actually, this was very much in the nature of a survey flight, and the route is being operated to a different schedule, the crossing to Amsterdam being made direct in two hours and a call being made at Hamburg in both directions. The actual time-table is as follows:—

G.M.T.	L.S.T.		Weekdays only			L.S.T.	G.M.T.
09.00	09.00	dep.	London (Abridge or Heston)		arr.	14.25	14.25
11.00	11.20	arr.	Amsterdam, Schipol	...	dep.	12.45	12.25
11.25	11.45	dep.	" "	...	arr.	12.20	12.00
13.25	14.25	arr.	Hamburg, Fuhlsbuttel	...	dep.	11.00	10.00
13.45	14.45	dep.	" "	...	arr.	10.40	09.40
15.20	16.20	arr.	Copenhagen, Kastrup	...	dep.	09.05	08.05
15.35	16.35	dep.	" "	...	arr.	08.50	07.50
15.45	16.45	arr.	Malmö, Bulltofta "	...	dep.	08.40	07.40

At first one service will be flown in each direction, but during the summer this schedule will be amplified by the addition of one more service in each direction. The extra service, it is understood, will be flown at night, leaving Malmö and London respectively after nightfall.

The single fare from London to Malmö is £13 and the return fare £23 8s.

Kastrup Airport, Copenhagen, is well equipped for night work, there being, in addition to the usual boundary lights and obstruction lights, five Siemens 10-kW. floodlights. Herr Sorensen, chief officer at the airport, demonstrated the system for the benefit of the visiting party, all of whom were particularly impressed by the large lighting repeater panel in the control room; as well as reproducing each boundary light by a red bulb, this panel has five fan-shaped ground-glass screens which light up as the corresponding floodlights are turned on, while most ingenious of all is a repeater for the illuminated wind tee, which exactly reproduces the movement of the actual one on the aerodrome; all these items are set out on the panel in their correct relative positions, so that the control officer virtually has an illuminated map of the whole airport in front of him. A Telefunken D/F. loop aerial surmounts the control tower, and it is likely that the Lorenz blind-landing system may be installed in the not far distant future.

Bulltofta airport, on the Swedish side of the Sound, is about to undergo extensive alteration which will make it an extremely fine aerodrome. At the moment its area is not over-large and it is partly surrounded by hillocks, which, however, are now being cut away. The chief officer, Herr Andersen, told us that the landing area is to be almost doubled, and a new customs and passenger building erected. The present lighting system, of Swedish manufacture, is a very complete one, but control

A snapshot taken at Amsterdam on the British Continental Airways inaugural flight. Leaving the machine is Mr. D. A. Adkins and in the group, left to right, are Messrs. J. R. Bryans, F. W. Jones, M. C. Bryans and W. K. Bear.

methods are to be improved, and the Lorenz system is expected to be in operation within a year at the outside.

Service extensions to Stockholm which may ultimately be made by one or more of the British companies will be well provided for, as the Swedish Government is now preparing an extensive scheme of emergency landing grounds every 20 km. along the 330-mile route, together with a number of beacons.

British Airways have secured the mail contract between London and Malmö, K.L.M. and A.B.A. undertaking the work in the opposite direction.

The British Continental Airways inaugural flight on the preceding Friday was of a considerably more formal nature, seven passengers travelling in the D.H.86 *St. George* in addition to the pilot. Flt. Lt. A. P. K. Hattersley (B.C.A.'s chief pilot) and the first officer, Mr. H. W. Hamblin. The passengers included Mr. F. W. Jones (managing director), Mr. J. R. Bryans (general manager), and Mr. D. A. Adkins (public relations officer).

Leaving Croydon at 9.5 a.m. they made a brief stop at Schiphol (Amsterdam), and then continued to Hamburg, where they were received by a distinguished gathering, which included officials of the Fuhlsbüttel airport and the British Consul-General.

At a formal luncheon in the new airport restaurant (which, situated above ground level, gives a commanding view over the aerodrome) Herr Schiller, Bezirksleiter See der D.L.H., expressed the pleasure of his company and of the German nation at the inauguration of the new service. It was the first time, he said, that a British aeroplane had arrived at Hamburg on a regular service. Mr. F. W. Jones, replying, stressed the point that the best part of commercial aviation was that, whether you landed at Hamburg or Berlin, or at any other foreign airport, you were welcomed not as an Englishman or a foreigner, but as a friend. He believed that this could only lead to a closer understanding between nations.

After a cheery evening in Hamburg the flight was continued on the Saturday morning to Kastrup, where the D.H.86 landed after a 1¼-hour flight, and the party was welcomed by Commander Godfred Hansen, chairman of D.D.L., and Herr Lybye, managing director. A luncheon followed, attended by the executive staff of D.D.L., Mr. Cable, of the British Legation, and representatives of the Danish Air Ministry.

Leaving Copenhagen at 4.45 p.m. local time the D.H.86 crossed to Bulltofta, where, in the absence of Capt. Florman through illness, Mr. P. A. Norlin received the visitors on behalf of A. B. Aerotransport, and later presided at a dinner.

The return flight, in mixed weather, started on the Sunday morning, the night spent in Amsterdam, and the journey concluded at Croydon on the Monday morning.

The service is being flown on Tuesdays and Fridays, and the time-table is as follows:—

	G.M.T.		G.M.T.
Dep. London (Horseferry House)	08.10	Dep. Malmö	09.00
Dep. Croydon	09.00	Arr. Copenhagen	09.15
Arr. Amsterdam	11.05	Dep. Copenhagen	09.30
Dep. Amsterdam	11.20	Arr. Hamburg	11.05
Arr. Hamburg	13.30	Dep. Hamburg	12.00
Dep. Hamburg	14.00	Arr. Amsterdam	14.10
Arr. Copenhagen	15.35	Dep. Amsterdam	14.30
Dep. Copenhagen	15.50	Arr. Croydon	16.35
Arr. Malmö	16.05	Arr. Horseferry House	17.25

The fares are £13 single and £23 8s. return.

SUPPLEMENTARY SERVICE ESTIMATES

SUPPLEMENTARY Estimates for the three Services were issued on Monday for the year ending March 31 next. The amounts are:

For the Navy	£4,850,000
For the Army	£1,350,000
For the Air Services	£1,611,000
For Army Ordnance	£100

The explanation issued with the Air Services Estimate is as follows:

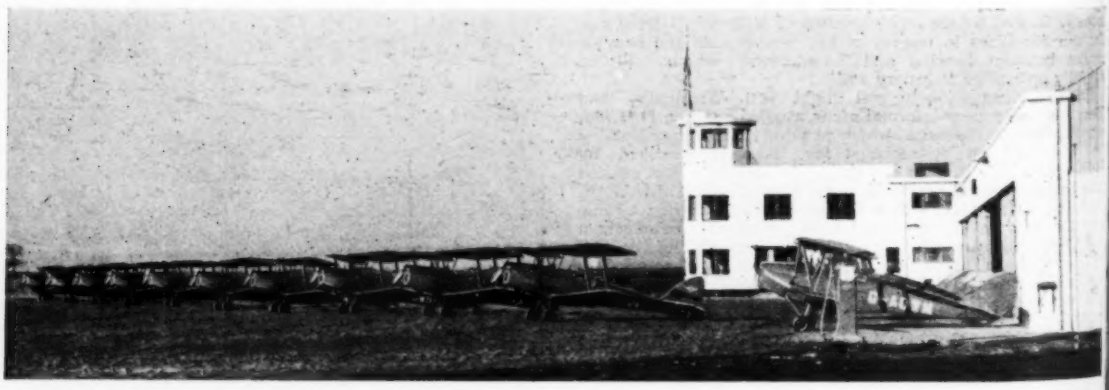
"The main purpose of this estimate is to make financial provision for the special measures taken in connection with the Italo-Abyssinian dispute.

"Provision is also made for extra expenditure required by the more rapid progress, particularly in the acquisition of land and on works services, which has been made in the scheme for the expansion of the Royal Air Force, details of which were furnished in the Supplementary Estimate for Air Services of July, 1935 (H.C. 102 of 1934-35). Increased expenditure at Singapore has resulted from the decision to accelerate the progress of the Singapore Defence Scheme in the light of the generous gift made by his Highness the Sultan and the State of Johore to his Majesty's Government in commemoration of the Silver Jubilee. Provision is made under Vote 4 for the receipt of £100,000 which represents the Air Ministry's share of this gift.

"To some extent the additional funds required can be met from savings which are expected to arise on various Votes. Thus expenditure in the provision of ground equipment for civil air routes has proceeded more slowly than anticipated, and there have been unavoidable delays in the inauguration of the West Africa, Bermuda, and Hong Kong services. There have been savings also on miscellaneous services and on pensions and gratuities due to the retention of personnel who would ordinarily have been transferred to the reserve or to the retired list.

"A table showing the allocation of the funds provided in the Supplementary Estimate includes £1,007,000 for special measures in connection with the Italo-Abyssinian dispute and £809,000 for additional expenditure on Royal Air Force expansion. There is an Appropriation-in-Aid of £205,000 to set against the latter sum, leaving a net total required by the Services of £1,611,000."

An additional sum of £120,000 is being asked for the Fleet Air Arm, making a total of £1,993,000 for the year under that heading.



RESERVE TRAINING IN SCOTLAND: The photograph above shows a line-up of D.H. Tiger Moths outside the new Reserve School which, established by Scottish Aviation Ltd., at Prestwick, near Ayr, started flying operations last Monday. The hangar accommodates twenty-five machines, and the administrative block contains lecture rooms, armament and photographic sections, parachute room and instructors' and pupils' quarters. The directors of the company are Mr. W. E. Nixon, Lord G. N. Douglas-Hamilton, Flt. Lt. D. F. McIntyre (who served as second pilot on the Everest expedition, and who is chief instructor) and Messrs. R. L. Angus and T. P. Mills. Eight flying instructors and a ground instructor are engaged.

CORRESPONDENCE

The Editor does not hold himself responsible for the views expressed by correspondents. The names and addresses of the writers, not necessarily for publication, must in all cases accompany letters intended for publication in these columns.

"TO HIM THAT HATH. . . "

IT is interesting for a mere outsider to speculate upon a few of the possible consequences of a recent announcement regarding the promise of subsidy to one company out of two who were competing for it on the Scandinavian air route, and to link it up with the fact that rumour is busy allocating a Post Office subsidy, called a mail contract, not, as one would suppose, to the company bereft of Air Ministry support, but to the same company which has been promised the subsidy.

The Air Ministry and the G.P.O. (presumably under Air Ministry advice) are entitled to choose their "chosen instrument" no doubt, but, since public money is involved, their choice has still to be submitted to both Houses of Parliament when the Subsidy Bill comes up for hearing.

What is the position on the line to Scandinavia? There are two companies in competition for Government support, British Airways, Ltd., and British Continental Airways, Ltd. Both, as their titles proclaim, are British, and would, therefore, normally receive fair and equal treatment in a country not yet run by a dictator.

Taking things all round, these two concerns may be regarded as equally well-equipped in financial standing, the backing of very important business groups, in efficiency and in organisation. What one gains, for example, from having been longer in the field, as a group of separate entities which later combined, is offset by the fact that the other has operated the first stretch of the England-Scandinavia route, viz., the London-Amsterdam line, for close on four months.

The Air Ministry is naturally keen to eliminate wasteful competition on a line already overstocked with old-established, efficiently operated foreign companies, and the idea may be to force an amalgamation between the two companies. If so it is a drastic step.

The other idea that naturally occurs to one is that by overwhelming one party with gifts and favours, the other, "the poor dog that got none," must throw its hand in, thus eliminating wasteful competition at the expense of justice and fair play.

If either of these was the motive of Government partiality on this occasion, it may prove to have been a gross error of judgment. A few years back the policy might have succeeded with some poor but honest company having but a few thousand pounds capital. To-day, unless all that one hears is false, there is no question of the company unblessed by official gold going out of business, for the simple reason that it is backed by immensely powerful financial interests unlikely to be impressed or intimidated by a state of affairs it must have foreseen from the start.

We are an old-fashioned people in many ways, and one of them is a bias in favour of fair play, and another is an intense dislike of official favouritism from a supposedly neutral Government body.

"OUTSIDER."

London, W.

[Editorial comment appears on page 191.—ED.]

FORCED LANDINGS

I READ with interest the response by Mr. R. P. Opie to my last letter on this subject. I agree that showing off and the desire to appear to put up a generally good show constitutes, for the young pilot, probably the greatest flying risk there is. As a matter of fact, even superficial thought shows that the same is true of practically any technique or craft involving physical activity. The embryo skater or skier is in precisely the same position in this respect. The footballer who, to gratify his own sense of importance, keeps the ball too long, almost always messes up the whole manœuvre before he can pass.

However, the sort of flying condition which I had in mind in my previous letter would essentially involve circumstances where the pilot would either be lost and so would not know of the presence of any beautiful young women on the ground, or would be so shaken at having to land (*e.g.*, owing to fog), that complacency would hardly come into the picture. Indeed, my case is that it is the very desire to take an added precaution in landing that leads to crashes. I mean the "precaution" of using the engine.

I am not at all sure that the proper method of teaching approaches of any kind nowadays is not to make the pupil fly in very low down from a mile away, and from the ability to do that, make him graduate to proper S-turn forced landings. It will be appreciated that this suggestion would mean that every pupil would, without having it rammed down his throat as something special, be well versed in the whole aspect of low flying; but he would get low flying into its proper association, *i.e.*, with landing and kindred manœuvres.

Incidentally, it is going to be interesting to see how the general run of pupils are affected by being trained on flapped aircraft. The use of flaps, although never suggested to be a shameful matter, is, perfectly obviously, merely a rumble.

London, W.C.2. W. E. P. JOHNSON.

REDUCING RESONANCE AND CORROSION

RESONANCE is one of the major problems met in attempting to reduce noise in modern transport aeroplanes, but a new process, the sole licensees for which are Cellon, Ltd., of Kingston-on-Thames, should find a variety of applications in overcoming this unfortunate phenomenon in aircraft. Known as the Michel and Marchal process, it entails the coating of metal panels with fibrous particles of cotton, silk or wool, the exact nature of the fibre to be employed depending on the type of surface to be treated. For example, where a surface would eventually be covered by upholstery or perhaps fittings, a coarse grade of wool fibre is recommended. Exposed surfaces, however, may be treated with the two objects of sound reduction and decoration and silk or cotton fibres would be utilised, a wide range of colours being available.

The method of application used by the Cellon decorators seems simplicity itself. First they apply a special adhesive undercoat by means of a brush or spray and then, while this is still in a tacky condition, administer the appropriate fibrous particles through the medium of a spraying pistol specially designed for the purpose. After one application resonance is considerably reduced, but where non-decorative finishes are concerned it is possible further to deaden sound by applying another coat or coats.

It is claimed that the special adhesive used acts in the dual capacity of sound-reducing agent and preventer of rust. The fibrous coating, as might be imagined, offers additional protection against corrosion and rust.

Incidentally, the process, which seems to be arousing no little interest in this country, is employed on the Breguet 393s used by Air France.

There is a second new and interesting Cellon "line," the efficacy of which *Flight* witnessed during a recent visit to Kingston. This is the "Cerrex" range of anti-corrosive undercoats and temporary protectives introduced for use with the lighter alloys—particularly those containing magnesium—which tend to corrode very easily. Actually the "Cerrex" products contain chromates of various metals chosen according to the metal to be treated and the corroding agent to which they are likely to be exposed. These chromates tend to render the metal concerned passive to corroding action, and this, it is claimed, in conjunction with the durable nature of the synthetic medium used, gives an ideal anti-corrosive undercoat. Drying or stoving is permissible, and the final finish is obtained with "Cerrux" synthetic lacquer or "Cerric" cellulose lacquer. The "Cerrex" temporary protective is used during the storage of bright parts. In the aircraft world, particularly with marine aircraft, it is quite common to apply this internally, where there is no danger of abrasion or friction, and to leave it for many months as an actual protective agent while the machine is in service.

Following a brief paragraph which appeared in *Flight* of February 13, it should be made clear that the patent is the property of Mr. W. Villa Gilbert, who has granted Cellon, Ltd., a licence to manufacture these chromatic undercoats and protective finishes.

THE INDUSTRY

Fitted—and Nearly Forgotten

THIS was the cable which K.L.G. Sparking Plugs, Ltd., received belatedly from Flt. Lt. Rose after his Cape flight: "Sorry late, but I forgot all about 'em—Tom Rose."

Colloidal Graphite

THE importance of colloidal graphite as an ingredient for "creeping" oils for spring lubrication and similar purposes is explained in a very interesting manner in a booklet recently issued by E. G. Acheson, Ltd., Thames House, Millbank, London, S.W.1; its title is "The Nature and Use of Penetrating and Spring Lubricants," and copies are obtainable on application.

Alloy Screws

WOOD screws made of aluminium alloy should be of considerable interest to the aircraft industry. Such screws are now being manufactured in large quantities by the British Aluminium Co., Ltd., Adelaide House, King William Street, London, E.C.4. Made from alloy wire of 26-28 tons tensile strength, they are only one-third the weight of steel or brass, and they are substantially cheaper than screws in nickel or chromium-plated brass.

Steel Construction

AN extremely well illustrated catalogue has just been issued in a new edition by the British Steelwork Association. It contains photographs of many hangars and aerodrome buildings in various parts of the world in which steel construction has been employed. Copies are obtainable on request from the British Steelwork Association at Artillery House, Artillery Row, Victoria Street, London, S.W.1.

Piston-ring Progress

APPLICATION was recently made to the committee of the London Stock Exchange for permission to deal in the shares of Wellworthy Piston Rings, Ltd., a company formed to carry on the business of Wellworthy, Ltd., piston-ring manufacturers.

It has been found necessary to convert what was previously a private company into a public concern owing to the considerable development which has taken place in the business during the past few years. This increase, together with the increased demand for the company's aircraft piston rings made from their patent material "Thermocrom," has necessitated further extension to their factory and plant.

Aircraft Ball Bearings

A LIST recently issued by the Hoffmann Manufacturing Co., Ltd., of Chelmsford, gives details of their range of ball bearings for controls and similar parts on aircraft. Actually, these bearings do not depart in any vital way from recognised Hoffmann construction, but they have been developed to meet the special requirements of aircraft work.

There are two types. In the T series, designed for use on tubes where the bore is necessarily large in comparison with the load, the section has been reduced to the minimum in order to keep the weight at the lowest possible level. Bearings of the T series should be mounted in housings which are suitably enclosed for their protection from weather and dirt and the retention of the lubricant.

The second type is the C.S. series, which are intended for such parts as control pulleys, hinges, etc., where small bearings are required. This pattern is provided with metal shields at each side to protect the working surfaces and retain grease; all exposed surfaces are cadmium plated to prevent rust, and during the assembly process they are filled with anti-freezing grease.

PERSONALITIES AND PETROL AT GRAVESEND: The aeroplane in this photograph, seen standing in front of the big hangar (erected by A. and A. J. Law, Ltd.) at Gravesend Airport, is the metal Moth which Miss Jean Batten flew to Australia, and which now belongs to Mr. Michael Sassoon, who keeps it at Gravesend. It is being refuelled from a T.B. 250-gallon portable unit which Airworthiness, Ltd., have found "to prove worth its weight in gold." In the left foreground are Mr. Garnon, the local Esso representative and Mr. H. C. Brown, manager of Airworthiness Ltd. The Airworthiness workshops are stated to be very busy, while the students of the Company's engineering school are now designing an aeroplane of their own.

NEW COMPANIES

In the notes below, for reasons of space the "objects" of new companies are usually somewhat abbreviated.

WELLWORTHY PISTON RINGS LTD.—Private company, registered February 11. Capital, £100 in 400 ordinary shares of 5s. Objects: to acquire the goodwill, business, and assets of Wellworthy Ltd. (which is in course of changing its name to W. P. (Lymington), Ltd.), and to manufacture pistons, piston rings, valves, valve seats, cylinder liners, gears, engines, and engine parts, etc. The first directors are James W. Howlett (life director) and others to be appointed by the subscribers. Registered office: Lymington, Hants.

THANET AERO CLUB LTD.—Private company registered February 16. Capital: £100 in £1 shares. Objects: to establish and conduct a club for affording facilities for flying, etc. The subscribers are: Whitney W. Straight, Brettenham House, Strand, W.C.2, company director; Fdk. A. S. Gwatkin, 31/4, Basinghall Street, London, E.C.2, solicitor. The first directors are to be appointed by the subscribers.

AIRWAYS UNION LIMITED was registered as a "private" company on February 6 with a nominal capital of £100 in £1 shares. Objects: to operate air lines, carry on business as motor coach proprietors, hotel proprietors, manufacturers of and dealers in motor cars, aeroplanes, etc. The subscribers (each with one share) are: Norman W. G. Edgar, Braeside, Little Stoke, Stoke Bishop, aircraft engineer; Lord Apsley, M.P., Petty France, Badminton, Glos. Registered office: at 40, Broad Street, Bristol.

STOCKPORT AVIATION COMPANY LTD. was registered as a private company on February 11, with a nominal capital of £10,000 in £1 shares. Objects: to manufacture and deal in seaplanes and aircraft of all kinds, to maintain hangars, etc., and to operate air lines. First directors: Charles R. Fairey, Maurice E. A. Wright, Thomas M. Barlow, Wilfred Broadbent and Louis M. Hilton. Registered office: North Hyde Road, Hayes, Mdx.

PUBLICATIONS, ETC., RECEIVED.

Aeronautical Research Committee Reports and Memoranda. No. 1636: Tests on Aerofoil Flaps in the Compressed Air Tunnel, by R. Jones, A. H. Bell and E. Smyth. Price 1s. 6d. No. 1674: Tables for Use in an Improved Method of Airscrew Strip Theory Calculation, by C. N. H. Lock and D. Yeatman. Price 2s. H.M. Stationery Office, Adastral House, Kingsway, London, W.C.2.

The History of Flight: Books, Engravings and Air Mail Stamps illustrating the evolution of the Airship and the Aeroplane. Maggs Bros., Ltd., 34 and 35, Conduit Street, W.1.

Booklet: *Fatigue of Wire.* Bruntons Ltd., Musselburgh, Scotland.

The Journal of the Royal Air Force College, Cranwell, Lincolnshire; Spring, 1936.

The Blue Book, 1936: The Directory and Handbook of the Electrical and Allied Industries. 54th edition. Price 25s. Benn Bros. Ltd., Bouverie House, Fleet Street, E.C.4.

The South American Handbook, 1936 edition. Price 2s. 6d. Trade and Travel Publications Ltd., 14, Leadenhall Street, London, E.C.3.

AERONAUTICAL PATENT SPECIFICATIONS

(The numbers in brackets are those under which the Specification will be printed and abridged, etc.)

(Published February 20, 1936.)

21304. TRESILIAN, S. S., RUBBRA, A. A., AND GASS, E. A: Airscrew drives (441,708).
7934. HEKIMIAN, A. J.: Screw propellers for aircraft (441,742).
7948. SIEMENS APPARATE UND MASCHINEN GES.: Method and device for controlling the steering of an aircraft in a predetermined direction (441,804).
27364. RENAULT, L.: Mounting and cooling engines for aircraft (441,823).

INCREASES OF CAPITAL.

J. GRANVILLE GRENFELL LTD. Engrs., mfrs. of engines for motor cars, aeroplanes, etc. (Brooklands Aerodrome, Byfleet, Surrey).—The nominal capital has been increased by the addition of £200 in £1 ordinary shares beyond the registered capital of £100.